976/1

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OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 7, 1978

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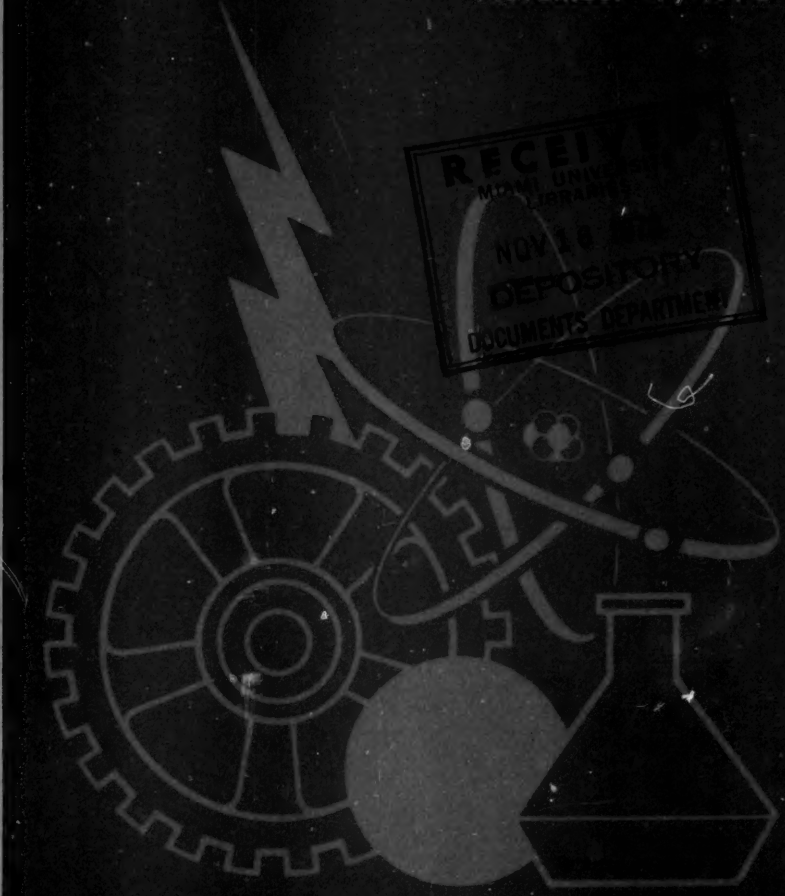

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

LUTRELLE F. PARKER,
May 2, 1978. *Acting Commissioner of Patents and Trademarks.*

Registration to Practice

The following list contains the names of persons applying fo registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before November 24, 1978:

Beauchamp, John P., Jr., 6629 Kirby Ct., Falls Church, Va. 22043

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Brown, Ronald J., 1920 S. First St., #1604, Minneapolis, Minn. 55454

Cippollone, Anthony D., 136 Lincoln Ave., Ridgewood, N.J. 07450

Custer, Granville Y., Jr., 9005 Kensington Pkwy., N. Chevy Chase, Md. 20015

DiPalma, Victor A., Olin Corp., 275 Winchester Ave., New Haven, Conn. 06511

Feinberg, Samuel, 12915 Goldhill Rd., Silver Spring, Md. 20906

Frenchick, Grady J., 6939 Collingwood Lane, #6, St. Paul, Minn. 55119

Goldstein, Jorge A., 3943 Newdale Rd., Apt. 30, Chevy Chase, Md. 20015

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Osborne, Eugene F., Sr., 3000 Old Tanytown Rd., Westminster, Md. 21157

Rasco, Marcus S., 117 N. Gollad St., Amarillo, Tex. 79106

Rowold, Carl A., 866 Sugar Hill Dr., Manchester, Mo. 63011

Stolzle, Frederick A., 550 Lee Dr., #217, Baton Rouge, La. 70808

Tayman, James H., Jr., 1959 Virginia Ave., McLean, Va. 22101

Thomson, Richard K., 1924 Yuma Lane, Mount Prospect, Ill. 60056

LUTRELLE F. PARKER,
Oct. 11, 1978. *Chairman, Committee on Enrollment.*

Looseleaf Rules of Practice in Patent and Trademark Cases

The Patent and Trademark Office has received a large number of inquiries about and suggestions for the publication of the Rules of Practice in Patent and Trademark Cases in looseleaf form again. The Office has been informed that such a publication of the patent and trademark Rules is available in a sturdy binder from:

Rules Service Company
Suite 301
3930 Knowles Avenue
Kensington, Maryland 20795
(301) 949-1090

The Rules Service Company indicates that each subscription includes a text of the rules that is up-to-date when sent, and all changes to that text that occur for the next twelve months, after which the subscription may be renewed. The cost of an initial subscription is $25.00, which should accompany the order.

The Government Printing Office continues to publish the Rules of Practice as Title 37, Code of Federal Regulations, which is reprinted annually.

RENE D. TEGTMEYER,
Oct. 13, 1978. *Assistant Commissioner for Patents.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,876,985, Birchall, Jr. and Purdy, ROTARY VALVES FOR LABORATORY GLASSWARE AND THE LIKE, **filed** Feb. 26, 1975, D.C.N.J. (Camden), Doc. 75-0339, *Fischer & Poeter Co.* v. *Kontes Glass Company, Inc.* Order of dismissal without prejudice, May 11, 1978.

2,923,507, L. S. Suozzo, CONSTANT SUPPORT DEVICE, **filed** May 5, 1978, D.C. Conn. (Hartford), Doc. H-78-225, *Bergen-Paterson Pipesupport Corporation* v. *Leonard S. Suozzo*

2,991,387, J. H. McCauley, INDICATOR TUBE; **3,227,922,** Glaser, Somlyody and Nace, ELECTRONIC INDICATOR CIRCUIT, **3,868,535,** G. A. Kupsky, MULTI-POSITION CHARACTER DISPLAY PANEL; **3,868,676,** Hennessey and Wescott, DISPLAY PANEL ELECTRODE TERMINATION; **3,952,223,** Kuchinsky, Wolfe, Maloney, and Hennessey, MULTIPLE CHARACTER FLAT PANEL DISPLAY DEVICE, **filed** May 9, 1978, D.C.N.J. (Newark), Doc. 78-998, *Burroughs Corporation* v. *Beckman Instrument, Inc.*

3,063,599, F. J. Kestel, SEED-DROP MECHANISM FOR PLANTER, **filed** Apr. 12, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c1395, *Frederick J. Kestel* v. *County Line Sales, Inc.*

3,087,620, G. Hirs, FILTER APPARATUS, **filed** Apr. 28, 1978, D.C., W.D.N.Y. (Buffalo), Doc. C-78-219, *Amsted Industries, Inc.* v. *M. J. French Company, Inc.*

3,183,688, M. D. Sobelson, BUOYANT ILLUMINATING DEVICE, **filed** May 4, 1978, D.C. Conn. (Bridgeport), Doc. B-78-182 *CMA, Inc. and Glow International Ltd.* v. *The Stop & Shop Companies, Inc. and Kings Dept. Stores, Inc.*

3,204,495, J. J. Matthews, INSULATION REMOVING TOOL; **3,562,189,** Farrissey Jr., McLaughlin, and Rose, PROCESS FOR CELLULAR POLYMERS CONTAINING IMIDE GROUPS, **filed** May 9, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c1809, *Ripley Co.* v. *Ideal Industries.*

3,227,922. (See 2,991,387.)

3,231,107, M. Clar, APPARATUS FOR THE COMPACTION AND DISPOSAL OF REFUSE, **filed** May 12, 1978, D.C. Md. (Baltimore), Doc. H-78-856, *Flinchbaugh Products, Inc.* v. *Milton Clar, Albert Shayne, Philip E. Shayne, and Wilson Shayne.*

3,250,702, J. A. Levendusky, PROCESS FOR PURIFYING LIQUIDS AND PARTICULATE ION EXCHANGE MATERIAL USED THEREFOR, **3,250,703,** same, PROCESS AND APPARATUS FOR REMOVING IMPURITIES FROM LIQUIDS, **filed** May 2, 1978, D.C. Conn. (Bridgeport), Doc. B-78-180, *Ecodyne Corporation* v. *Croll-Reynolds Engineering Co., Inc.*

3,250,703. (See 3,250,702.)

3,253,495, J. F. Orloff, HARDENED BLIND BOLT WITH ANNEALED SHANK PORTION, **filed** Sept. 2, 1977, D.C. Del. (Wilmington), Doc. 77-339, *Huck Manufacturing Company* v. *VSI Corporation.*

3,247,310, H. B. Stinson, Jr., MUSICAL INSTRUMENT, **3,283,056,** Cookerly and Hall, CONTROLLED HARMONIZATION FOR MUSICAL INSTRUMENTS, **filed** Dec. 4, 1975, D.C,. S.D. Ind. (Evansville), Doc. EV75-156-C, *Norlin Music, Inc.* v. *Kimball International, Inc.* Dismissed upon stipulation of the parties on May 15, 1978.

3,283,056. (See 3,247,310.)

3,370,491, R. C. Cross, METHOD OF AND APPARATUS FOR CUTTING HELICALLY INCLINED SLOTS IN TUBULAR MEMBERS, **filed** May 8 ,1978, D.C., N.D. Ga. (Atlanta), Doc. C78-834A, *Personal Products Co.* v. *Vincent R. Sneider.*

3,462,964, R. K. Haroldson, AIR CONDITIONER CONTROL MEANS RESPONSIVE TO VEHICLE ENGINE POWER DEMANDS, **filed** July 16, 1976, D.C., M.D. Fla. (Orlando), Doc. 76-279-Orl-CR, *Ralph K. Haroldson and Halem Industries, Inc.* v. *Louis Volkswagen, Inc. et al.* Stipulated judgment, plaintiffs claim for infringement and defendants for non-infringement are dismissed with prejudice, May 8, 1978.

3,503,082, M. Kerwit, HOSPITAL BED, **filed** May 4, 1978, D.C., N.D. Tex. (Dallas), Doc. CA3–78–0539–F, *Humanetics, Inc.* v. *Kerwit Medical Products, Inc. and Malcolm Kerwit.*

3,562,189. (See 3,204,495.)

3,611,035, E. S. Douglas, GROUND FAULT PROTECTIVE SYSTEM HAVING GROUNDED NEUTRAL PROTECTION; **3,836,821,** Wahlgren and Douglas, GROUNDED FAULT PROTECTIVE SYSTEM, **filed** May 1, 1978, D.C. Minn. (Minneapolis), Doc. C4–78–175, *Square D Company, Inc.* v. *Minnesota Mining and Manufacturing Company.*

3,658,459, J. A. Gartlan, ABSORBENT FOR PURIFYING DRY-CLEANING SOLVENTS, **filed** Apr. 21, 1978, D.C., E.D. Pa. (Philadelphia), Doc. 78–1329, *Pursol Chemical Corp.* v. *D. C. Filter and Chemical Inc.*

3,742,745, P. F. Swenson, Sr., METAL FORMING METHOD AND APPARATUS, **3,840,808,** L. N. Liebermann, CLAMP-ON ELECTRICAL METER, **filed** Mar. 28, 1978, D.C., S.D. Fla. (Fort Lauderdale), Doc. 78–1067–C–Ncr, *Control Power Systems, Inc. and Edward A. Jeffers* v. *TIF Instruments, Inc., Thermal Industries, and Leonard N. Liebermann.*

3,757,087, D. Barnard, HEATING ELEMENTS, **filed** May 3, 1978, D.C., N.D. Ohio (Toledo), Doc. C–78–190, *Interdynamics Inc. and Smiths Industries, Limited* v. *Elitra Corporation.*

3,775,788, B. Markwitz, INFLATABLE SWIMMING SUPPORTS, **filed** May 5, 1978, D.C., N.D. Calif. (San Francisco), Doc. C–78–1005, *Kransco Mfg. Inc.* v. *Bernhard Markwitz.*

3,819,153, Hurst and Hobbins, RESCUE TOOL, **filed** May 1, 1978, D.C., N.D. Ill. (Chicago), Doc. 78c1687, *Hurst Performance, Inc.* v. *Lukas American, Inc. et al.*

3,836,821. (See 3,611,035.)

3,840,808. (See 3,742,745.)

3,868,535. (See 2,991,387.)

3,868,676. (See 2,991,387.)

3,894,484, Anstey and Soteropulos, BALE WRAPPING MECHANISM FOR LARGE CYLINDRICAL BALES, **3,913,473,** G. F. Meiers, BALE WRAPPING MECHANISM FOR LARGE CYLINDRICAL BALES, **filed** May 1, 1978, D.C., S.D. Iowa (Des Moines), Doc. 78–135–2, *Deere & Company* v. *Vermeer Manufacturing Company.*

3,906,630, S. G. Megna, SCISSORS, PARTICULARLY HAIRDRESSERS' SCISSORS, **filed** Sept. 8, 1977, D.C., M.D.N.C. (Winston-Salem), Doc. C–77–423–Ws, *Diane Products, Inc.* v. *Jeffco, Inc., B & H Supply Company, Inc. and W. P. Harrison.*

3,913,473. (See 3,894,484.)

3,952,223. (See 2,991,387.)

3,999,552, W. H. Huggins, EPILATOR, **filed** Mar. 29, 1977, D.C. Conn. (Bridgeport), Doc. B–77–112, *Epilator Corporation* v. *Universal Technology, Inc. and Depilatron Inc.* Stipulation of dismissing complaint without prejudice; dismissing counterclaims without prejudice, Apr. 7, 1978. **Same, filed** Feb. 10, 1977, D.C., S.D.N.Y., Doc. 77–C–0685 HFW, *Depilatron Inc.* v. *Individually Yours, Inc. and Individually Yours International, Ltd.*

4,037,418, J. I. Hannan, LOAD SUPPORTING BEARING PLATE, **filed** May 11, 1978, D.C., W.D. Pa. (Pittsburgh), Doc. 78–513, *Jennmar Corporation* v. *Phillips Stampings Co., Inc.* **Same, filed** May 1, 1978, D.C., S.D. W. Va. (Charlestown), Doc. 78–2107, *Phillips Stampings Co., Inc.* v. *Bethlehem Steel Corp. and Persingers Supply Company, Inc.*

4,058,221, Elkins and Hanz, WINDOW RACK, **filed** Apr. 17, 1978, D.C., N.D. Tex. (San Angelo), Doc. CA–6–78–0013, *E-Z Mount Corporation* v. *San Angelo Company, Inc.*

4,058,317, J. B. McCarthy, APPARATUS FOR PLAYING A BOARD GAME, **filed** Nov. 15, 1977, D.C.N.J. (Newark), Doc. 77–2346, *Smurfit Cartins Ltd.* v. *K-Tel International Limited.* Plaintiff is hereby dismissed without prejudice, Apr. 25, 1978.

D. 210,205, C. R. Cordell, Jr., FISHING LURE, **filed** May 9, 1978, D.C., W.D. La. (Shreveport), Doc. 780565, *Cordell Tackle, Inc.* v. *William H. (Bill) Lewis, doing business as B & L Manufacturing Co. and Bill Lewis Bass Lures.*

D. 240,819, W. Macowski, DESK CADDY, **filed** May 25, 1978, D.C., S.D.N.Y., Doc. 78–C–1884 JMC, *Ketcham & McDougall, Inc.* v. *Jay Import Co.*

D. 246,874, L. B. Schwartz, HANDBAG, **filed** Feb. 23, 1978, D.C. Conn. (Bridgeport), Doc. B–78–66, *Acricite Co., Inc.* v. *Transparent Products Corp.* Plaintiff withdrew action as to all parties, May 16, 1978. **Same, filed** Feb. 27, 1978, D.C. Conn. (Bridgeport), Doc. B–78–80, *Acricite Co., Inc.* v. *The Richers Wholesale Distributors, Inc.* Final judgment on consent shall not be cited by any party hereto as an adjudication of contested issues, nor used for advertising, Apr. 28, 1978.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,308,065, Re. S.N. 942,212, Filed Sep. 14, 1978, Cl. 252/82, SCALE REMOVAL FERROUS METAL PASSIVATION AND COMPOSITIONS THEREFOR, Chester A. Lesinski, Owner of Record: *The Dow Chemical Company, Midland, Mich.,* Attorney or Agent: Richard G. Waterman, et al., Ex. Gp.: 166

3,438,811, Re. S.N. 942,208, Filed Sep. 14, 1978, Cl. 134/2, REMOVAL OF COPPER CONTAINING INCRUSTATIONS FROM FERROUS SURFACES, Lester W. Harriman, et al., Owner of Record: *The Dow Chemical Company, Midland, Mich.,* Attorney or Agent: Richard G. Waterman, et al., Ex. Gp.: 173

3,730,483, Re. S.N. 941,333, Filed Sep. 8, 1978, Cl. 254/150 R, ASSEMBLY FOR PULLING A LINE, E. Strohm Newell, Owner of Record: *Milprint, Inc., Milwaukee, Wis.,* Attorney or Agent: Neil F. Markva, Ex. Gp.: 315

3,737,003, Re. S.N. 937,399, Filed Aug. 28, 1978, Cl. 180/78, ADJUSTABLE CONTROL CONSOLE FOR VEHICLES, Duane E. Beals, et al., Owner of Record: *Caterpillar Tractor Co., Peoria, Ill.,* Attorney or Agent: Ralph E. Walters, et al., Ex. Gp.: 316

3,879,263, Re. S.N. 939,427, Filed Sep. 5, 1978, Cl. 195/103.5, METHOD FOR THE DETERMINATION OF AMYLASE, Thomas H. Adams, Owner of Record: *E. I. du Pont de Nemours and Company, Wilmington, Del.,* Attorney or Agent: James L. Jersild, Ex. Gp.: 172

3,967,970, Re. S.N. 943,305, Filed Sep. 18, 1978, Cl. 106/41, CELLULATION METHOD AND PRODUCT, John W. North, Owner of Record: *Inventor,* Attorney or Agent: Edward Taylor Newton, et al., Ex. Gp.: 113

3,974,490, Re. S.N. 933,132, Filed Aug. 9, 1978, Cl. 340/268, PAPER ROLL DIAMETER SENSING DEVICE FOR USE WITH PAPER SPLICING APPARATUS, Yasuharu Mori, Owner of Record: *Rengo Company, Osaka, Japan,* Attorney or Agent: John E. Lind, et al., Ex. Gp.: 234

3,975,842, Re. S.N. 936,404, Filed Aug. 24, 1978, Cl. 37/58, METHOD AND APPARATUS FOR DREDGING EMPLOYING A TRANSPORT FLUID FLOWING IN SUBSTANTIALLY CLOSED RECIRCULATING COURSE, Johannes Franciscus Reinardus Andriae, Owner of Record: *Bos Kalis Westminster Group N.V., Sliedrecht, Netherlands,* Attorney or Agent: John T. Kelton, et al., Ex. Gp.: 337

3,977,435, Re. S.N. 938,163, Filed Aug. 30, 1978, Cl. 137/625.3, CONTROLLED PRESSURE DROP VALVE, Charles L. Bates, Jr., Owner of Record: *Inventor,* Attorney or Agent: H. Ross Workman, et al., Ex. Gp.: 341

3,978,650, Re. S.N. 939,941, Filed Sep. 6, 1978, Cl. 58/23 AC, ELECTRONIC TIMEPIECE, Yukio Hashimoto, et al., Owner of Record: *Citizen Watch Co. Ltd., Tokyo, Japan,* Attorney or Agent: Frank J. Jordan, Ex. Gp.: 217

3,978,818, Re. S.N. 938,959, Filed Sep. 1, 1978, Cl. 119/1, LITTER PACKAGES, Ladd L. Heldenbrand, Owner of Record: *Inventor,* Attorney or Agent: Stuart A. White, Ex. Gp.: 333

3,980,339, Re. S.N. 939,420, Filed Sep. 5, 1978, Cl. 299/2, PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS, David D. Heald, et al., Owner of Record: *Geokinetics Inc., Concord, Calif.,* Attorney or Agent: Carl R. Brown, Ex. Gp.: 354

3,984,532, Re. S.N. 943,251, Filed Sep. 15, 1978, Cl. 424/1.5, METHOD FOR QUANTITATIVE DETERMINATION OF RENIN ACTIVITY IN BLOOD EMPLOYING PHENYL METHYL SULFONYL FLUORIDE AND POLYETHYLENE GLYCOL, Aurora L. Fernandez de Castro, Owner of Record: *Inventor,* Attorney or Agent: Abraham A. Saffitz, Ex. Gp.: 223

4,007,219, Re. S.N. 929,383, Filed Jul. 31, 1978, Cl. 260/501.17, BENZOPHENONE GLYCINAMIDE DERIVATIVES, Cedric Herbert Hassall, et al., Owner of Record: *Hoffman-La Roche Inc., Nutley, N.J.,* Attorney or Agent: Jon S. Saxe, et al., Ex. Gp.: 126

4,026,311, Re. S.N. 930,658, Filed Aug. 2, 1978, Cl. 134/48, APPARATUS FOR CLEANING INSIDE AND OUTSIDE SURFACES OF CONTAINER, John Maxwell Jackson, Owner of Record: *Cleamax Limited, Potters Bar, England,* Attorney or Agent: Alvin Browdy, et al., Ex. Gp.: 173

4,030,129, Re. S.N. 937,678, Filed Aug. 28, 1978, Cl. 360/32, PULSE CODE MODULATED DIGITAL AUDIO SYSTEM, William E. Whitlock, Owner of Record: *Lase Industries, Van Nuys, Calif.,* Attorney or Agent: Lewis M. Dalgarn, Ex. Gp.: 235

4,034,441, Re. S.N. 939,136, Filed Sep. 1, 1978, Cl. 17/4, PRESIZING DISC WITH SELF-LOCKING MEANS, Vytautas Kuncikevicius, et al., Owner of Record: *Union Carbide Corporation, New York, N.Y.,* Attorney or Agent: James C. Arvantes, et al., Ex. Gp.: 324

4,043,375, Re. S.N. 942,204, Filed Sep. 14, 1978, Cl. 157/1, RIM CONSTRUCTION AND TOOL APPARATUS FOR SAFE TIRE INFLATION, Robert Casey, Owner of Record: *Caterpillar Tractor Co., Peoria, Ill.,* Attorney or Agent: Ralph E. Walters, et al., Ex. Gp.: 323

4,044,426, Re. S.N. 939,137, Filed Sep. 1, 1978, Cl. 17/49, STUFFING APPARATUS, Vytautas Kupcikevicius, et al., Owner of Record: *Union Carbide Corporation, New York, N.Y.,* Attorney or Agent: James C. Arvantes, et al., Ex. Gp.: 324

4,054,131, Re. S.N. 939,829, Filed Sep. 5, 1978, Cl. 128/130, INTRAUTERINE CONTRACEPTIVE DEVICE, Elton Kessel, Owner of Record: *International Projects Assistance Services, Inc., Chapel Hill, N.C.,* Attorney or Agent: B. B. Olive, Ex. Gp.: 335

4,060,311, Re. S.N. 933,507, Filed Aug. 14, 1978, Cl. 350/160 R, ELECTROCHROMIC DEVICE, Mino Green, Owner of Record: *Imperial Chemical Industries Limited, London, England,* Attorney or Agent: None, Ex. Gp.: 257

4,063,435, Re. S.N. 940,240, Filed Sep. 7, 1978, Cl. 70/38 A, PADLOCK CLOSURE, Roy N. Oliver, Owner of Record: *Medeco Security Locks Inc., Salem, Va.,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 351

4,076,940, Re. S.N. 924,469, Filed Jul. 14, 1978, Cl. 542/447, CONVERSION OF ACID S, PRODUCED BY THE ORGANISM *POLYANGIUM CELLULOSUM* VAR. *FULVUM* INTO ACID F, David T. Connor, et al., Owner of Record: *Warner Lambert Company, Morris Plains, N.J.,* Attorney or Agent: Albert H. Graddis, et al., Ex. Gp.: 117

4,079,572, Re. S.N. 942,233, Filed Sep. 14, 1978, Cl. 53/53, PACKAGE FLAP FOLDING APPARATUS, Jerome J. Vande Castle, Owner of Record: *EMC Corporation, San Jose, Calif.,* Attorney or Agent: Louis J. Pizzanelli, et al., Ex. Gp.: 324

PATENT NOTICES

Certificates of Correction for the Week of Nov. 7, 1978

Re. 29,324	4,071,489	4,086,295	4,093,573
D. 248,218	4,072,082	4,086,352	4,093,621
3,738,087	4,072,946	4,086,414	4,093,650
3,745,187	4,072,990	4,086,962	4,093,678
3,896,097	4,074,474	4,087,650	4,093,694
3,919,376	4,075,204	4,087,807	4,093,729
3,934,966	4,075,482	4,087,844	4,093,900
3,971,601	4,075,655	4,087,875	4,094,108
3,976,608	4,076,762	4,088,435	4,094,390
4,005,211	4,076,943	4,088,615	4,094,820
4,006,962	4,078,438	4,088,815	4,094,972
4,007,363	4,079,062	4,089,026	4,095,000
4,011,209	4,079,188	4,089,517	4,095,002
4,019,303	4,079,430	4,089,876	4,095,519
4,028,104	4,079,486	4,089,900	4,096,104
4,035,325	4,079,495	4,089,919	4,096,905
4,039,879	4,080,199	4,090,538	4,097,221
4,041,496	4,081,100	4,090,628	4,097,333
4,042,519	4,081,422	4,090,886	4,097,810
4,051,512	4,082,332	4,090,924	4,097,901
4,059,082	4,083,903	4,092,104	4,099,690
4,059,514	4,084,011	4,092,194	4,111,777
4,061,880	4,084,182	4,092,368	4,113,284
4,065,442	4,084,810	4,092,714	4,113,327
4,066,681	4,085,134	4,092,903	4,113,377
4,067,785	4,085,187	4,092,963	4,113,436
4,068,201	4,085,294	4,093,005	
4,069,739	4,086,136	4,093,314	

Errata

All reference to Patent No. 4,115,889 to Max Sporri of Switzerland for PORTABLE APPARATUS FOR CLEANING A DENTAL PROSTHESIS appearing in the OFFICIAL GAZETTE of September 26, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,116,800 to John E. Currey, Colin S. McLarty and Donald H. Porter of New York for ELECTROLYTIC CELL WITH REDUCED INTERELECTRODE GAP appearing in the OFFICIAL GAZETTE of September 26, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,117,506 to David Emil Carlson of Pennsylvania and Christopher Roman Wronski of New Jersey for AMORPHOUS SILICON PHOTOVOLTAIC DEVICE HAVING AN INSULATING LAYER appearing in the OFFICIAL GAZETTE of September 26, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,118,884 to John W. Campbell and Lawrence Wesley Campbell of Alabama for FISHHOOK appearing in the OFFICIAL GAZETTE of October 10, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,120,320 to Harold M. Gibbons of California for ARTICULATED FLUID CONDUIT WITH AUXILIARY SUPPORT appearing in the OFFICIAL GAZETTE of October 17, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,123,106 to Tsoung-Yuan Yan of Pennsylvania for IN SITU LEACH METHOD FOR RECOVERING URANIUM AND RELATED VALUES appearing in the OFFICIAL GAZETTE of October 31, 1978 should be deleted since no patent was granted.

All reference to Patent No. Re. 29,808 to Stephen C. Dangel of Massachusetts for MACHINE FOR KNITTING CORD-LIKE STRUCTURES appearing in the OFFICIAL GAZETTE of October 24, 1978 should be deleted since no patent was granted.

Patents Available for Licensing or Sale

3,924,901. PARTICLE BUILD-UP SUPPRESSOR. Woodrow W. Phillips, 815 North Gilmore Ave., Apt. 105, Lakeland, Fla. 33801.

4,026,086. BUILDING BRICK. David Thomas Langley, Jr., 1809 Butts St., Georgetown, S.C. 29440.

4,085,488. METHOD AND APPARATUS FOR WINDING AND FORMING COOLING COILS. Benteler-Werke Aktiengesellschaft, Werk Neuhaus, Schloss Nehaus, Federal Republic of Germany. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

4,092,902. A LATHE ATTACHMENT FOR GENERATING SPHERICAL SURFACES. Joseph W. Serafin, 222 Flat Hills Road, Amherst, Mass. 01002.

4,112,748. AUTOMATIC PORTABLE SOLID STATE VOLTAGE REGULATOR TESTER. Richard J. Walley, 6392 Marshall Ave., Buena Park, Calif. 90621.

The following 2 patents are offered by Philip Boone, 15 Fenwick Road, Winchester, Mass. 01890.

4,106,616. DEVICE FOR POSITIONING A CONTAINER OF SUPPLEMENTAL MATERIAL IN OPERATIONAL ALIGNMENT ADJACENT TO A TOILET-TISSUE HOLDER.

4,106,617. BATHROOM FIXTURE.

The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to: RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

4,103,483. ELECTRONIC WRISTWATCH.

4,104,567. TELEVISION RASTER WIDTH REGULATION CIRCUIT.

4,104,569. HORIZONTAL DEFLECTION CIRCUIT WITH AUXILIARY POWER SUPPLY.

4,104,589. CHUCK FOR USE IN THE TESTING OF SEMICONDUCTOR WAFERS.

4,104,832. METHOD FOR FORMING KEEL-TIPPED STYLUS FOR VIDEO DISC SYSTEM.

4,105,298. ELECTRO-OPTIC DEVICES.

4,105,468. METHOD FOR REMOVING DEFECTS FROM CHROMIUM AND CHROMIUM OXIDE PHOTOMASKS.

4,105,654. LIQUID CRYSTALLINE 4-CYANO-OR 4-NITRO-BENZYLIDENE - 4'-(N,N-DIALKYLAMINO)-1-AMINOAZABENZENE DYES.

4,105,901. MONOSTABLE CIRCUIT.

4,105,915. DEFLECTION-TYPE MODULATOR OF LASER BEAM FOR COMMUNICATIONS.

4,105,926. ON-AXIS FILM SCANNER WITH REFLECTED ILLUMINATION.

4,105,944. QUIESCENT BIASING OF R-F POWER TRANSISTORS FOR OTHER THAN CLASS A OPERATION.

4,105,947. PULSE WAVE PHASE AND FREQUENCY DETECTOR.

4,105,948. FREQUENCY SYNTHESIZER WITH RAPIDLY CHANGEABLE FREQUENCY.

4,105,950. VOLTAGE CONTROLLED OSCILLATOR (VCO) EMPLOYING NESTED OSCILLATING LOOPS.

4,105,959. AMPLITUDE BALANCED DIODE PHASE SHIFTER.

4,106,020. FM-CW RADAR RANGING SYSTEM.

4,106,021. POLAR TO RECTANGULAR COORDINATE CONVERTER.

4,106,048. INTEGRATED CIRCUIT PROTECTION DEVICE COMPRISING DIODE HAVING LARGE CONTACT AREA IN SHUNT WITH PROTECTED BIPOLAR TRANSISTOR.

4,106,053. DIGITAL SAMPLING RATE CONVERSION OF COLOR TV SIGNAL.

4,106,059. PHASE LOCKED LOOP TELEVISION TUNING SYSTEM.

4,106,060. ELECTRONIC MAIL BOX.

4,106,086. VOLTAGE MULTIPLIER CIRCUIT.

4,106,107. MIS READOUT DEVICE WITH DIELECTRIC STORAGE MEDIUM.

4,106,532. MACHINE FOR STRAIGHTENING THE WIRE LEADS OF A DEVICE.

4,107,351. METHOD OF DEPOSITING OR REPAIRING A PATTERNED METAL LAYER ON A SUBSTRATE.

4,107,556. SENSE CIRCUIT EMPLOYING COMPLEMENTARY FIELD EFFECT TRANSISTORS.

4,107,680. DIGITALLY PROCESSED RADAR SPEED SENSOR.

4,107,689. SYSTEM FOR AUTOMATIC VEHICLE LOCATION.

4,108,323. MACHINE FOR CHANGING THE SPACING OF A PLURALITY OF WAFERS.

4,108,367. TOKEN AND READER FOR VENDING MACHINES.

4,108,407. ADJUSTMENT DEVICE.

4,108,660. FABRICATION OF DIFFRACTIVE SUBSTRACTIVE FILTER EMBOSSING MASTER.

4,108,686. METHOD OF MAKING AN INSULATED GATE FIELD EFFECT TRANSISTOR BY IMPLANTED DOUBLE COUNTERDOPING.

4,108,793. LIQUID CRYSTAL CELL.

4,109,166. CLAMPING CIRCUIT.

4,109,177. CATHODE-RAY TUBE HAVING APERTURED MASK.

4,109,178. ELECTRON MULTIPLIER WITH SWITCHABLE BEAM CONFINEMENT STRUCTURE.

4,109,191. ROTATOR WITH REMOTE INDICATOR AND SELF-SYNCHRONIZATION.

4,109,202. TRAFFIC SWITCHING IN COMMUNICATIONS SATELLITES.

4,109,209. PULSE STAGGERING CIRCUIT.

4,109,242. MATRIX ADDRESS SYSTEM USING ERASE OPERATION.

4,109,247. CLUTTER FREE COMMUNICATIONS RADAR.

4,109,271. AMORPHOUS SILICON-AMORPHOUS SILICON CARBIDE PHOTOVOLTAIC DEVICE.

4,109,276. MEMORY READ/WRITE ORGANIZATION FOR A TELEVISION SIGNAL PROCESSOR.

4,109,283. FREQUENCY COUNTER FOR TELEVISION TUNING SYSTEM.

4,109,299. ELECTRICAL CONNECTION BETWEEN CONDUCTORS ON SPACED PLATES.

4,109,632. GTO IGNITION CIRCUIT.

4,109,919. PACKAGE ACTUATED RECORD EXTRACTING MECHANISM FOR A VIDEO DISC PLAYER.

4,110,259. ELECTROCHROMIC CERMET MATERIAL AND DEVICE INCLUDING THE SAME.

4,110,488. METHOD FOR MAKING SCHOTTKY BARRIER DIODES.

4,110,692. AUDIO SIGNAL PROCESSOR.

4,110,693. LOCKUP INHIBITING ARRANGEMENT FOR A PHASE LOCKED LOOP TUNING SYSTEM.

4,110,700. ELECTRONICALLY TUNABLE MICROWAVE FREQUENCY FET DISCRIMINATOR.

4,110,735. ERROR DETECTION AND CORRECTION.

4,110,784. NOISE REDUCTION APPARATUS.

4,110,785. CLOCK GENERATOR FOR VIDEO SIGNAL PROCESSING.

4,110,787. COMBINED BLANKING LEVEL AND KINESCOPE BIAS CLAMP FOR A TELEVISION SIGNAL PROCESSING SYSTEM.

D. 248,753. RECORD.

General Motors Corporation, owner by assignment of the patents identified below, desires to give public notice that it is prepared to grant a nonexclusive license under the patents upon reasonable terms.

3,902,824. BLADE LOCK.

3,905,348. SHOCK PROOF ENGINE OVERSPEED CONTROL.

3,915,274. DOUBLE AREA PISTON CLUTCH.

3,919,619. APPARATUS FOR GENERATING THREE-PHASE SINUSOIDAL VOLTAGES.

Application for license may be addressed to the Director, Patent Section, General Motors Building, 3044 West Grand Blvd., Detroit, Mich. 48202.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
California	Los Angeles Public Library	(213) 626-7555 Ext. 274
	Sunnyvale Patent Library*	(408) 736-0795
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
Illinois	Chicago Public Library	(312) 269-2814
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1458
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(404) 472-3411
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County Public Library	(513) 369-6969
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 242-7361 Ext. 258
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 7, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	11-4-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	12-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-1-78
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-3-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods: Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	9-23-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications: Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	5-16-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signaling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	5-6-77
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	10-19-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	4-3-78
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	2-17-77
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	1-3-77
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	10-3-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	12-19-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors: Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-28-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	10-31-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	8-24-77

Expiration of patents: The patents within the range of numbers indicated below expire during October 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,002,192 to 3,007,168, inclusive
Plant Patents..... Numbers 2,095 to 2,100, inclusive

XEROX LICENSE OFFER

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The Manager of Patent Licensing
Xerox Corporation
Stamford, Connecticut 06904

Xerox shall in accordance with the terms of the Consent Order:

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  (b) patents which are required to be licensed pursuant to the terms of paragraph X of the Consent Order, if any, and

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The following is a list of patents which is believed to include all of the PATENTS available for licensing in accordance with the terms of the Consent Order. Fuji Xerox, Ltd. patents which also make up part of the list are grouped separately. There also follows a classification index for use in conjunction with the classification data appearing in the patent list to identify the category of the patent and a schedule of foreign countries and their corresponding key letters which are used in identifying corresponding foreign patents in the list. Since the classification system is not restricted solely to OFFICE COPIER PRODUCTS there are several patents included in the list to which the Consent Order is not applicable.

LIST CLASSIFICATION

The Patents are listed in numerical order according to their class assignment. For example, all U.S. patents classified as 1(A) appear at the beginning followed by those classified as 1A1, 1A1A, 1A1B, etc. The left-hand column shows the U.S. patent number. To the right of the U.S. patent number is its title followed by its issue date. Following the U.S. patent issue date is a list of the foreign patents based on the U.S. patents. An example of how the list should be used is as follows:

Under Class 1A which is entitled "Electrostatographic Systems, Imaging Systems—Distinctive Photosensitive Members Imaged", two U.S. patents are listed—2,573,881 which issued November 6, 1951 with corresponding patents in Australia, Canada, Germany, Great Britain, Switzerland and Sweden, and 3,877,936 which issued April 15, 1975 with a corresponding patent in Belgium.

XEROX PATENT CLASSIFICATION INDEX

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1. Electrostatographic Systems
2. Distinctive Photosensitive Members
3. Charging Systems
4. Optical Image Formation and Projection
5. Latent Image Development Systems and Compositions
6. Copy Substrate Handling Systems
7. Developed Image Transfer & Display
8. Image Fixing Systems
9. Cleaning of Imaging Surface
10. Document Handling
12. Photoelectrophoresis
15. Imaging Systems Other Than Electrostatographic
17. Optical Systems
18. Chemical Compositions & Preparation Thereof
20. Mechanical Components
21. Metal Working, Forming and Treating
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25. Electronic Components
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32. Miscellaneous

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        - b. Alloys of Selenium
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        - d. PbO in Binder
        - e. Group IIIa Phosphides
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     2. Organic Photosensitive Members
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        - b. Charge Transfer Complexes
        - c. Photochromic Compounds
        - d. Photopolymerizable Compounds
     3. Photosensitive Members with Subadjacent Barrier Layer
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     6. Multilayered Members (Support-Intermediate Layer-Photoconductor)
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     3. Half-tone Imaging Systems
     4. Deformation Imaging Systems
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        - b. Relief
     5. Reversal Printing Systems
   - D. Duplex Imaging Systems
   - E. Color Xerographic Systems
   - F. Imaging Systems for Preparing Duplicating Masters
   - G. Imaging Systems—Distinctive Development Systems
     1. Magnetic Recording Systems
     2. Multiple Copying Systems with Partial Transfer
     3. Imaging Systems Employing Adhesive Transfer Web
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     5. Imaging Systems Capable of Development in Ambient Light
     6. Imaging Systems with Liquid Polar Ink Development
   - H. Display Systems with Imaging Capability
     1. Projection of a Xerographic Image (PROXI)
     2. Pin Matrix
   - I. Imaging Systems with Image Enhancement
   - J. Electrostatographic Apparatus
     1. Total Reproduction Systems
     2. Cameras
     3. Variable Imaging Speed
     4. Moving Document Reproduction
     5. Flat Plate Electrostatographic Apparatus
     6. Flexible Electrostatographic Apparatus
     7. Count Control Apparatus
     8. Developer Dispensing and Control Apparatus
   - K. Miscellaneous Methods and Apparatus
     1. Electrometers
     2. Reflex Imaging Systems
     3. Resist Formation System

2. DISTINCTIVE PHOTOSENSITIVE MEMBERS
   - A. Photosensitive Members—Novel Compositions
     1. Inorganic
        - a. Selenium
        - b. Alloys of Selenium with Arsenic and/or Antimony
        - c. As_2S_3 and Combinations Thereof with Selenium
        - d. Group III A Phosphides (Ga, Al or B)
        - e. Chalcogenides (Compounds Containing O, S, Se, or Te)
          - (1) ZnO
          - (2) PbO
        - f. Dye Sensitized Inorganic Photoconductors
        - g. Inorganic Photoconductors in Glass Binders
     2. Organic
        - a. Photosensitive Organic Compounds in a Binder
        - b. Lewis Acid Charge Transfer Complexes
   - B. Multi-Layered Photosensitive Members
     1. Members Having Subadjacent Barrier Layers
     2. Members Having Protective Overlayer
     3. Members Having Electroluminescent Layer
     4. Members Having Releasable or Soluble Layer
   - C. Deformation Imaging Members
   - D. Fibrous Photosensitive Member
   - E. Photosensitive Members—Novem Fabrication Techniques and Configurations
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   - C. Corotron Charging Systems
     1. A.C. Charging
     2. Negative Charging
     3. With Fringe or Needle-like Electrodes
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     6. Charge Level Smoothing
     7. Toner Dust Control
     8. Charge Sensing to Terminate Charging

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F. Charging Including Illumination of Photoconductor

4. OPTICAL IMAGE FORMATION AND PROJECTION

A. Illumination of Original

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2. Document Holders
   a. Platen Covers
3. Illumination Control Systems

B. Projection of Optical Image onto Photoresponsive Member

1. Scanning Systems—In General
   a. Distinctive Optical Scanning Systems
      (1) Lens Strip
      (2) Fiber Optics
      (3) Half Tone Projection Systems
      (4) Fresnel Lens
2. Simultaneous Charging and Projection of Optical Image
3. Distortion of Optical Image (e.g., for Coding Purposes)
4. Full Frame Exposure
5. Reflex Exposure
6. Projection with Variable Magnification
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7. Projection of Composite Image

C. Control of Image Contrast

5. LATENT IMAGE DEVELOPMENT SYSTEMS AND COMPOSITIONS

A. Powder Cloud Development

1. Aerosol Development Methods and Apparatus in General
   a. Plate Development Apparatus
2. Cloud Charging Methods and Devices
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   b. Cloud Directing Devices and Methods
4. Induction Development
5. Cleaning Devices
6. Charcoal Development Method

B. Fibrous Brush Development Devices and Methods

C. Magnetic Brush Development (Dry)

1. Magnetic Brush Development Methods and Devices
   a. Magnetic Belt Devices
   b. Loading Devices
2. Color Producing Development
3. Single Component Magnetic Developer

D. Cascade Development

1. Gravitational Developer Handling Methods and Devices
   a. Incremental (e.g., Bucket Devices)
   b. Continuous (e.g., Wheel)
   c. Magnetic
   d. Non-Linear Developer Flow
2. Impact Developing Methods and Devices
3. Developer Contact and Concentration Control Apparatus
4. Background Suppression Apparatus
5. Flat Plate Development

E. Liquid Development

1. Liquid Aerosol Development
2. Emulsion Development
3. Encapsulated Liquid Development
4. Electrophoretic Development
5. Polar Ink Development

F. Donor Development Methods and Apparatus

G. Dense Bed Development Methods and Apparatus

H. Fluidized Bed Development Methods and Apparatus

I. Toner and Developer Dispensing Methods and Apparatus

1. Developer Dispensing
2. Toner Dispensing
   a. Powdered Toner Containers
   b. Solid Toner Containers
   c. Dispensing Apparatus
      (1) Without Concentration Control
      (2) With Concentration Control

J. Development Electrodes

1. Electrode Types in General
2. Segmented Electrodes
3. Flexible Electrodes
4. Self-Cleaning Electrodes
5. With Variation of Potential

K. Contrast and Large Area Development Enhancement

L. Simultaneous Positive-Negative Formation

M. Reversal Development

N. Developer, Toner and Carrier Compositions

1. Three Component Developer-Carrier, Toner and Additive
   a. Inorganic Additive
   b. Organic Additive
2. Two Component Developer
   a. Distinctive Toner
      (1) Polystyrene-Containing
      (2) Phenol-Formaldehyde Containing
   b. Distinctive Carrier
3. One Component
4. New Carriers
5. New Toners
   a. Distinctive Pigment
   b. Encapsulated Liquids
6. Developer Manufacture
   a. Carrier Preparation
   b. Toner Preparation

O. Miscellaneous

P. Simultaneous Development and Cleaning

6. COPY SUBSTRATE HANDLING SYSTEMS

A. Paper Holding Trays

1. With Stack Height Control

B. Seriatim Stack Feeding Devices

1. Mechanical
2. Aeriform

C. Non-Seriatim Stack Feeding Devices

D. Sheet Tracking, Registration, Aligning, Conveying Devices

1. Belt Conveyors
2. Clutch Mechanisms

E. Sheet Holding Devices (During Image Transfer)

F. Mispuff and Multiple Sheet Detecting Devices

- G. Counter Devices
- H. Sheet Stripping Devices
- I. Sheet Cutting Devices
- J. Sheet Inverting Devices
- K. Copy Distribution, Collection and Sorting Devices

7. DEVELOPED IMAGE TRANSFER AND DISPLAY
   - A. Image Display Systems
     1. Reflective Projection
     2. Transmittive Projection
   - B. Chemical Treatment to Enhance Transfer
   - C. Electrostatic Transfer of Toner
     1. Corona Charging Systems
        a. With Conductive Transfer Web
     2. A.C. Field Transfer
     3. Multiple Transfer
     4. Selective Transfer
   - D. Magnetic Transfer of Toner
   - E. Pressure Transfer of Toner
     1. With Heat
     2. With Solvent
     3. With Tackified Copy Substrate
        a. Gelatin Coated Substrate

8. IMAGE FIXING SYSTEMS
   - A. Heat Fixation
     1. Radiation
        a. Flash Heating
        b. Control Systems
        c. Glass Panel Heating
     2. Conduction
        a. With Pressure Means
     3. Convection
     4. Induction
   - B. Fixation with Vapor Fixative
     1. Fixative Removal
   - C. Fixation with Liquid Fixative
   - D. Fixation with Solid Fixative
   - E. Fixation with Pressure
     1. Gelatin Coated Copy Substrate

9. CLEANING OF IMAGING SURFACE
   - A. Frictional
     1. Web
     2. Brush
        a. With Brush Scraper
        b. With Electrostatic Assist
           (1) Within a Liquid
        c. Filter Bag For Use with
   - B. Non-Frictional
     1. Magnetic Brush
     2. Cleaning Beads
     3. Liquid

10. DOCUMENT HANDLING
    - A. Document Feed Apparatus
    - B. Microfiche Handling Systems
    - C. Stack Feeding Apparatus
    - D. Facsimile Feeding Apparatus
    - E. Document Registration Systems
    - F. Document Inverting Apparatus
    - G. Stacking and/or Imbricating Apparatus
    - H. Collating Apparatus
    - I. Document Jamming Detection Devices

12. PHOTOELECTROPHORESIS
    - A. Basic Process and Materials
    - B. Basic Apparatus
    - C. Machines
    - D. Air Breakdown
    - E. Blocking Electrode
    - F. Camera Apparatus
    - G. Cleaning
    - H. Apparatus Components
    - I. Composite Particle
    - J. Fixing
    - K. Inking
    - L. Masking
    - M. Pigments (Including PEP Use of Particular Pigment)
    - N. Process Variation
    - O. Sensitizors
    - P. Shear
    - Q. Transfer
    - R. Use of Image

15. IMAGING SYSTEMS OTHER THAN ELECTROSTATOGRAPHIC
    - A. Deformation Imaging
    - B. Polymerization Imaging
      1. Photopolymerization Imaging
      2. Charge Injection Polymerization Imaging
    - C. Ferromagnetic Imaging
    - D. Photochromic Imaging
    - E. Vesicular Imaging
    - F. Exposure Only Imaging

17. OPTICAL SYSTEMS
    - A. Radiation Sensing
      1. X-ray, Ultraviolet
      2. Solar Cell
      3. Spectral Response Junctions
      4. Photocell Circuits
    - B. Optical Projection and Modulation
      1. Image Projection
      2. Lenses, Transparencies
      3. Kerr Cell
      4. Modulators
    - C. Image Conversion and Intensification
      1. Emission
      2. Infrared
      3. Passive
      4. Active (Semiconductor)
    - D. Character Generation and Display Devices
      1. Deflection Generated Display
      2. Character Mask
      3. Translation and Function Generation
      4. Justifier
      5. Optical Lens Arrangements
    - E. Optical Imaging and Scanning
      1. Photosensitive Scanners and Spot Scanning Systems
      2. Field Effect Scanners
      3. Lenticular
      4. Scanning Lens Strip and Rotating Mirror Mechanisms
      5. Thermotropic, Thermal, Deformation
      6. Optical Stabilizing Devices
    - F. Electron Beam Devices

1. Tubes
2. Circuits

G. Electroluminescent Devices
1. Storage with Field Effect Device
2. Storage Panels—Construction
3. Display, Actuation
4. Enhancement, Amplifications, Conversion

H. Stimulated Emission Devices
1. Laser Structure and Materials
2. Laser Structures
3. Laser Optical Systems and Applications

I. Optical Devices
1. Pressure Gauge
2. Density Measuring
3. Fiber Optics

J. Miscellaneous

18. CHEMICAL COMPOSITIONS AND PREPARATION THEREOF

A. Photosensitive
1. With a Liquid Vehicle
2. Phthalocyanine
a. X-Form
3. Carboxamides
4. Naphthols

B. Polymers

C. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component Developer
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Manufacture
b. Toner Preparation

D. Brazing Compositions

20. MECHANICAL COMPONENTS

A. Mechanical Reaction Devices
1. Belts
2. Drives
3. Pulleys and Rollers
4. Load Movers
5. Clutch
6. Transport Motor and Speed Controls

B. Dispensing and Filtering Devices
1. Powder Cloud
2. Particulate Material Dispensing, Distribution
3. Filtering

C. Sensing Devices
1. Powder Level
2. Temperature
3. Quality (Web)
4. Pressure Gauge
5. Wind
6. Weight
7. Thickness

D. Work Devices (Mechanical)
1. Holding, Forming, Feeding
2. Bonding and Fastening
3. Coupling (Pipe)
4. Testing
5. Molding
6. Valves
7. Sizing

E. Antenna Structure

F. Fluid Amplifiers and Magnetically Controllable Switching Devices

G. Miscellaneous

21. METAL WORKING, FORMING AND TREATING

A. Electroforming and Plating
1. Methods
2. Structure
3. Apparatus

B. Metal Treating

24. GRAPHIC ARTS

A. Liquid Ink Recording
1. Electrically Responsive System
2. Electromechanically Responsive System
3. Magnetically Responsive System
4. Photoresponsive System

B. Photographic Copying
1. Transparency Formation
a. Document Support
b. Projection and Exposure
(1) Simultaneous Exposure and Development of Different Frames
(2) Image Reversal Optics
(3) Automatic Masking
c. Transparency Identification
d. Frame Counting and Locating
e. Miscellaneous
2. Contact Printing From a Transparency
a. Transparency Feed
b. Establishing and Maintaining Contact Between Transparency and Copy Material
c. Exposure Control
d. Transfer Imaging
(1) Image Layer Support Strip
3. Processing
a. Material Purification
b. Transparency Transport
4. Viewing

C. Duplicating
1. Method and Apparatus
a. Thermographic
b. Pressure Applied to Sandwich of Original, Transfer and Receiving Sheet
c. Transfer of Electrostatic Charge Through Stencil
d. Condensation Imaging
e. Spirit and Dry Duplicating Systems (Including ELCAR)
(1) Means for Rotably Mounting a Transfer Sheet
(2) Means for Establishing Pressure Between Transfer Sheet and Copy Substrate
(3) Copy Substrate Handling
(4) Program Control
(5) Formation of a Spirit Duplicating Transfer Sheet
(6) Formation of a Stencil Transfer Sheet

(7) Composition of a Transfer Sheet, Receiving Sheets and Printing Inks
D. Planographic Imaging (Including Lithography)
E. Relief Imaging
F. Gravure Printing
G. Miscellaneous

25. ELECTRONIC COMPONENTS
A. Passive Components
1. Printed Circuit Boards
2. Semiconductor Devices
3. Thin Film Components
4. Connectors
B. Active Components
1. Space Charge Devices
2. Junction Devices
3. Thermionic Conversion Devices
4. Thyratrons
C. Circuits
1. Amplifiers
2. Switching
3. Oscillators and Generators
4. Pulse Circuitry, Including Signal Storage and Delay
5. Power Supply
6. Miscellaneous

26. DESIGN PATENTS
A. Reproduction Apparatus
1. In General
2. Document Feeding Apparatus
3. Transfer and Fusing Apparatus
4. Printer
5. Camera
B. Sorting and/or Storing Apparatus
C. Containers for Xerographic Powder
D. Labeling Apparatus
E. Facsimile Transmission Apparatus
1. In General
2. Transceiver Paper Feed Apparatus
3. Adapter for Facsimile Computer System
F. Microform Apparatus
1. Viewer and/or Copier
G. Educational Devices
1. Scales
H. Miscellaneous
1. Housing For Electronic Apparatus
2. Computer Keyboard
3. Send/Receive Data Printer Terminal
4. Telephone Acoustic Coupler
5. Prism
6. Paper Shredder
7. Other

27. PHOTOGRAPHY
A. Direct Printout Members
B. Direct Printout Processes
C. Imaging Member Fabrication
D. Photographic Processes Generally

30. MANIFOLD
A. Basic Process
B. Apparatus
C. Process Variations
D. Activation
E. Image Transfer and Fixing
F. Duplication Masters
G. Image Reversal
H. Reflex Imaging
I. Color Processes

31. MIGRATION IMAGING (XDM)
A. Basic Process
B. Apparatus
C. Process Variation
D. Imaging Members
E. Imaging Member Fabrication
F. Imaged Members
G. Stripping and Splitting
H. Reversal
I. Fixing
J. Duplicating Masters
K. Color
L. Use of Image

32. MISCELLANEOUS
A. Energy Cells
B. Miscellaneous

FOREIGN COUNTRY KEY LETTER CODE

COUNTRY KEY	COUNTRY NAME
AAA	NO FOREIGN FILING
ALB	ALBANIA
ALG	ALGERIA
ARG	ARGENTINA
ATR	AUSTRIA
AUS	AUSTRALIA
BAH	BAHAMAS
BAR	BAHRAIN
BEL	BELGIUM
BOL	BOLIVIA
BRA	BRAZIL
BRS	BR. SOLOMON ISL.
BRU	BRUNEI
BUL	BULGARIA
BUR	BURUNDI
CAM	CAMBODIA
CAN	CANADA
CEY	CEYLON
CHL	CHILE
CHN	CHINA
CLB	COLOMBIA
COR	CONGO REP. (ZAIRE)
COS	COSTA RICA
CUB	CUBA
CZC	CZECHOSLOVAKIA
DNK	DENMARK
DOR	DOMINICAN REP.
ECD	ECUADOR
EGP	EGYPT
EGR	E. GERMANY
EIR	EIRE
ELS	EL SALVADOR
FIJ	FIJI
FIN	FINLAND
FOM	FORMOSA
FRA	FRANCE
GER	GERMANY
GHA	GHANA
GIB	GIBRALTAR
GIE	GIBERT & ELLICE
GNR	GUINEA REP.
GRB	GR. BRITAIN
GRK	GREECE
GUA	GUATEMELA
GUR	GUERNSEY
HGK	HONG KONG
HOL	HOLLAND
HON	HONDURAS
HUN	HUNGARY
ICE	ICELAND
IDS	INDONESIA
IND	INDIA
IRL	IRELAND
IRN	IRAN
ISR	ISRAEL
ITL	ITALY
JAM	JAMAICA
JAP	JAPAN
JER	JERSEY
KEN	KENYA
KOR	KOREA
KUW	KUWAIT
LAS	LAOS
LEB	LEBANON
LIB	LIBERIA
LXB	LUXEMBOURG
MAU	MAURITIUS
MEX	MEXICO
MLI	MALI
MLS	MALASIA
MLT	MALTA
MLW	MALAWI
MNC	MONACO
MRC	MOROCCO
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PLD	POLAND
PLP	PHILIPPINES
PNM	PANAMA
PRU	PERU
PTG	PORTUGAL
RHD	RHODESIA
RMN	RUMANIA
RWD	RWANDA
SAB	SAUDI ARABIA
SAF	SOUTH AFRICA
SBH	SABAH
SGP	SINGAPORE
SHL	ST. HELENA
SLN	SIERRA LEONE
SPN	SPAIN
SRK	SARAWAK
STZ	SWITZERLAND
SWA	SO. WEST AFRICA
SWD	SWEDEN
SYA	SYRIA
TGR	TANGIER
THL	THAILAND
TIW	TAIWAN
TNS	TUNIS
TRD	TRINIDAD
TRK	TURKEY
TZN	TANZANIA
UGD	UGANDA
UK	UNITED KINGDOM (Fuji Xerox list only)
URG	URUGUAY
USA	USA
USR	USSR
UAR	UNITED ARAB REP
VTM	VIETNAM
VZL	VENEZUELA
YGS	YUGOSLAVIA
ZMB	ZAMBIA
ZZZ	

FOREIGN COUNTRY KEY LETTER CODE

FUJI XEROX PATENTS

Class 1A1C

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%. APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1,522,612, ITL. 798303, NOR. 122730, U.K. 1,183,762.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 1A1F

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 1A2C

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,799,773.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A PHOTOCHROMIC COMPOUND AND TRANSPARENT TONER. MAR. 26, 1974.

Class 1A6

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 1C4B

3,563,733.—METHODS OF PREPARING RELIEF IMAGES BY ENZYMATIC DIGESTION. FEB. 16, 1971. BEL. 709856, CAN. 830395, FRA. 1564578, JAP. 46-11628, U.K. 1217087.

3,630,728.—ELECTROPHOTOGRAPHIC METHOD OF FORMING RELIEF IMAGES. DEC. 28, 1971. BEL. 728693, CAN. 877883, FRA. 2002.362, JAP. 46-41348, U.K. 1228509.

Class 1E

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,615,392.—ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS. OCT. 26, 1971. CAN. 902986, JAP. 46-43951.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 925929, JAP. 48-28697.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 7531555, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,779,639.—COLOR ELECTROPHOTOGRAPHIC APPARATUS. DEC. 18, 1973. U.K. 1331870.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-23905, U.K. 1322847.

3,806,340.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A POLAR ORGANIC SOLVENT VAPOR. APR. 23, 1974. BEL. 774765, CAN. 946671, FRA. 7138742, JAP. 49-23905, U.K. 1322847.

Class 1F

3,473,923.—REPRODUCTION PROCESS INCLUDING TRANSFER AND REDEVELOPMENT OF ELECTROSTATICALLY FORMED IMAGES. OCT. 21, 1969. BEL. 679506, FRA. 1479592, GER. 1,522,597. JAP. 43-07586, U.K. 1152832.

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

3,788,845.—PROCESS FOR FORMING DYE IMAGES. JAN. 29, 1974.

Class 1G

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 1I

3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

Class 1J6

3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.

Class 1K

3,408,217.—FINGERPRINT RECORDING. OCT. 29, 1968. JAP. 41-21520, U.K. 1095572.

3,492,140.—METHOD OF RECORDING FINGERPRINTS OF HUMAN BODY. JAN. 7, 1970. FRA. 1386116, JAP. 39-27575, U.K. 1063635.

Class 1K3

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

Class 2A1E

3,506,595.—PHOTOCONDUCTIVE INSULATING MATERIALS. APR. 14, 1970. FRA. 1498064, GER. 1,522,606, JAP. 43-24394, U.K. 1148537.

3,615,401.—PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CdS OR CdS.N $CdCo_2$. OCT. 26, 1971. FRA. 2001257, JAP. 47-40819, U.K. 1239129.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

Class 2A1E1

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,494,766.—LIGHT SENSITIVE LAYER FOR ELECTROPHOTOGRAPHY. FEB. 10. 1970. CAN. 791648, FRA. 1460449, NOR. 112288, SWD. 226000, U.K. 1085939.

3,494,789.—PHOTOCONDUCTIVE INSULATING MATERIAL. FEB. 10, 1970. CAN. 813830, FRA. 1564467, ITL. 788829, JAP. 44-10631, MEX. 88112, U.K. 1120091.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 753155, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

3,725,060.—HEMATEIN OR HEMATOXYLIN-CONTAINING ZINC OXIDE PHOTOCONDUCTIVE LAYERS. APR. 3, 1973. JAP. 49-4340.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973. JAP. 45-990335.

Class 2A1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE CONTAINING ELECTRON DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,704,123.—DYE SENSITIZED PHOTOCONDUCTIVE MATERIAL. NOV. 28, 1972. AUS. 424510, BEL. 720260, CZC. 142206, FRA. 1568416, GER. 1772210, ITL. 831114, JAP. 47-20753, U.K. 1190676, USR. 374866.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

Class 2A1G

3,541,028.—PHOTOCONDUCTIVE INSULATING MATERIALS. NOV. 17, 1970. FRA. 1494699, GER. 1,522,605, JAP. 43-14494, U.K. 1128417.

Class 2A2

3,647,428.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAR. 7, 1972. AUS. 429949, BEL. 759550, CAN. 924162, FRA. 2072521, ITL. 923181, JAP. 48-4316, U.K. 1269429.

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 2A2A

3,707,369.—PHOTOCONDUCTIVE ELEMENTS CONTAINING 2-METHYL-3, 3-DIMETHYL INDOLE DERIVATIVES. DEC. 26, 1972. BEL. 754969, CAN. 898823, FRA. 703049, GER. 2041490, U.K. 1268889.

Class 2B

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPN. 371685, STZ. 519188, U.K. 1272131.

4,023,181.—RECORDING MEDIUM CONDUCTIVE ELECTRODE. MAY 10, 1977. JAP. 49-91720.

4,042,936.—ELECTROSENSITIVE RECORDING METHOD. AUG. 16, 1977. JAP. P49-042206.

Class 2B1

3,574,682.—ELECTROSTATIC RECORDING MATERIALS. APR. 13, 1971. U.K. 1213395.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 2B2

3,552,956.—METHOD FOR TREATING ELECTROPHOTOGRAPHIC RECORDING MATERIALS WITH PROTECTIVE OVERCOATINGS. JAN. 5, 1971. BEL. 693184, FRA. 1508918, SWD. 326372, U.K. 1155665.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762.808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

Class 2B4

3,428,453.—IMAGING FORMING PROCESS UTILIZING XEROGRAPHY. FEB. 18, 1969. FRA. 1,428,775, ITL. 754,825, JAP. 43-02622, U.K. 1,085,151.

Class 2E

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238, JAP. 40-26402, U.K. 1,081,324.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80% APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTOGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,672,988.—METHOD OF MANUFACTURING BASES FOR ELECTROSTATIC RECORDING MATERIAL OR ELECTROPHOTOGRAPHIC MATERIAL. JUNE 27, 1972. AUS. 437336, BEL. 746420, CAN. 898621, GER. 2008636, ITL. 888758, JAP. 47-45549, U.K. 1301926.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1522612, ITL. 798303, NOR. 122730, U.K. 1183762.

3,927,638.—VACUUM EVAPORATION PLATING APPARATUS. DEC. 23, 1975.

3,984,585.—VACUUM EVAPORATION PLATING METHOD. MAY 5, 1976. FRA. 7422500, GER. P-2430653.4, JAP. 48-72263, U.K. 1,214,698.

Class 2F

3,998,548.—SENSITIVE DRUM RECEIVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC REPRODUCING MACHINE. DEC. 21, 1976. JAP. 49-94060, U.K. 32984/75.

Class 3

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 3C

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED WITH A MIXTURE OF A HYGROSCOPIC MATERIAL AND A HYDROPHILIC BINDER. OCT. 12, 1971. BEL. 726690, CAN. 885615, JAP. 47-12440.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 3C1

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

Class 3C3

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972. CAN. 940590, JAP. 48-28301, U.K. 1279758.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972. CAN. 922359, JAP. 48-25942, U.K. 1323599.

Class 3C4

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973. CAN. 948693, FRA. 7108391, ITL. 921208, U.K. 1281149.

Class 3C5

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

3,779,749.—METHOD OF CHARGING IN ELECTROPHOTOGRAPHY. DEC. 18, 1973. BEL. 772412, CAN. 9481495, FRA. 7132246, ITL. 942080, JAP. 49-17532, U.K. 1359182.

3,788,844.—CHARGING METHOD FOR ELECTROPHOTOGRAPHY. JAN. 29, 1974. JAP. 49-13025, U.K. 1344908.

3,789,222.—CORONA CHARGE METHOD. JAN. 29, 1974. BEL. 771311, CAN. 943180, FRA. 7129655, ITL. 933902, JAP. 49-17530.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 3C9

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 906045, JAP. 46-30636.

Class 3D

3,546,545.—METHOD OF CHARGING A PHOTOCONDUCTIVE INSULATING LAYER. DEC. 8, 1970. BEL. 721040, FRA. 1586221, U.K. 1205297.

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

Class 3E

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPAN. 371685, STZ. 519188, U.K. 1272131.

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

Class 3F

3,749,927.—ELECTROSTATIC CHARGING PROCESS FOR ELECTROPHOTOSENSITIVE MATERIAL. JULY 31, 1973. AUS. 435008, BEL. 469413, FRA. 7123717, ITL. 934461, JAP. 49-16060, U.K. 1316047.

3,778,148.—APPARATUS AND METHOD FOR SELECTIVELY DISCHARGING THE PHOTOCONDUCTIVE SURFACE OF AN ELECTROSTATIC DRUM COPIER TO FACILITATE THE CLEANING THEREOF. DEC. 11, 1973.

3,778,623.—CHARGING METHOD OF ELECTROPHOTOGRAPHIC MATERIALS. DEC. 11, 1973. FRA. 7229549.

3,789,223.—CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS. JAN. 29, 1974. AUS. 431512, BEL. 771143, FRA. 7129349, ITL. 935108, JAP. 49-17529, U.K. 1347100.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 4A

3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.

Class 4A1

3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973. U.K. 1350616.

3,841,752.—LIGHT SOURCE FOR COPYING MACHINE. OCT. 15, 1974.

Class 4A2

3,737,223.—PLATEN DRIVING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 5, 1973. U.K. 1341619.

Class 4B

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. ARG. 182081, BEL. 759454, CAN. 932785, FRA. 7043828, ITL. 909538, JAP. 49-18265, U.K. 1327486.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-11573, U.K. 1326580.

Class 4B1

3,927,940.—MANUSCRIPT SCANNING DEVICE FOR COPYING MACHINES AND THE LIKE. DEC. 23, 1975.

3,955,048.—SCANNING METHOD AND APPARATUS. MAY 4, 1976.

Class 4B1A

3,778,153.—OPTICAL IMAGING SYSTEM. DEC. 11, 1973.

4,063,813.—METHOD OF EXPOSING A LIGHT SENSITIVE MEMBER. DEC. 20, 1977. JAP. 51-89646, U.K. 76-19272.

Class 4B7

3,313,883.—SYSTEMS FOR RECORDING CHARACTERS ON LIGHT SENSITIVE RECORDING SURFACES. AUG. 25, 1964. CAN. 693,055, FRA. 1,246,197, GER. 1,449,634, JAP. 318,009.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

Class 5A1A

3,451,376.—DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY. JUNE 24, 1969. AUS. 410555, FRA. 1556520, SWD. 319382, U.K. 1173377.

Class 5A2

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A3B

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A4

3,681,065.—DYE TRANSFER COLOR ELECTROPHOTOGRAPHY. AUG. 1, 1972. CAN. 884,227, JAP. 44-32208.

Class 5A5

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 915753, CAN. 933997, JAP. 48-13454.

Class 5C

3,927,641.—DEVELOPING MECHANISM USING MAGNETIC BRUSH. DEC. 23, 1975.

3,937,181.—MAGNETIC BRUSH TYPE DEVELOPING MECHANISM IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 10, 1976.

Class 5C1

3,545,968.—DEVELOPING A LATENT ELECTROSTATIC IMAGE WITH FERROMAGNETIC CARRIER AND TONER BY EMPLOYING A VARYING MAGNETIC FIELD. DEC. 8, 1970. BEL. 710692, FRA. 1561470, U.K. 1205175.

3,908,595.—MAGNETIC BRUSH DEVELOPMENT APPARATUS UTILIZING MAGNETIC MEANS. SEPT. 30, 1975.

3,977,361.—MAGNETIC BRUSH DEVELOPMENT DEVICE. AUG. 31, 1976. GER. P2521275.3, JAP. 49-52302, KOR. 3670, TIW. 6410622, U.K. 19955-75.

3,981,271.—MAGNETIC BRUSH TYPE DEVELOPER FOR USE IN AN ELECTROPHOTOGRAPHIC MACHINE. SEPT. 21, 1976. GER. P25073910, JAP. 49-19615, U.K. 6841-75.

3,985,099.—MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 12, 1976. GER. P2521291.3 JAP. 52303, KOR. 3669, TIW. 6410736, U.K. 19951-75.

4,048,958.—MAGNETIC BRUSH DEVELOPING DEVICE. SEPT. 20, 1977. KOR. 4052-74, TIW. 22,999, U.K. 9472/76, W. GER. P2611755.5.

Class 5C2

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 5D1

3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.

Class 5D2

3,336,904.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 22, 1967. BEL. 651786, GER. 1,472,946, HOL. 132649, JAP. 40-23755, U.K. 1068575.

Class 5D3

3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.

Class 5E

3,540,885.—REDUCTION OF FOG FORMATION IN AN ELECTROPHOTOGRAPHIC LIGHT SENSITIVE SHEET. NOV. 17, 1970. BEL. 693302, FRA. 1509571, JAP. 44-2551, U.K. 1176001.

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. BEL. 751669, CAN. 902982, FRA. 7021033, ITL. 893939, JAP. 48-18859, U.K. 1284477.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972 CAN. 867698.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.

3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. ARG. 181932, AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, MEX. 116451, U.K. 1292200.

3,692,523.—PROCESS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE AND LIQUID DEVELOPER USED THEREFOR. SEPT. 19, 1972. AUS. 437065, BEL. 745533, CAN. 924.167, FRA. 7040233, GER. 20052680, ITL. 888.449, JAP. 48-7821, U.K. 1255445.

3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

3,749,059.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. JULY 31, 1973. AUS. 445683, BEL. 755061, CAN. 903579, FRA. 7029636, JAP. 48-25936, U.K. 1267888.

3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 948843, U.K. 1328313.

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430772, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,766,887.—DEVELOPING DEVICE FOR ELECTROSTATIC LATENT IMAGE. OCT. 28, 1973. AUS. 429869, BEL. 761227, CAN. 102437, FRA. 2075270, ITL. 919235, U.K. 1310092.

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.

3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, JAP. 1348667, MEX. 120938.
3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.
3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.
3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.
3,991,711.—ELECTROSTATIC DUPLICATING METHOD AND APPARATUS UTILIZING WET DEVELOPING. NOV. 16, 1976. FRA. 733636, GER. 2350429, JAP. 47-101120, U.K. 1,443,209.
4,029,826.—ELECTROSTATIC PRINTING METHOD. JUNE 14, 1977. FRA. 7434015, GER. P2448211.9, JAP. 48-112875, U.K. 43016-74.

Class 5E4

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TOWER-FREE ZONE. MAY 4, 1971. AUS. 418640, CAN. 871081, FRA. 1592038, JAP. 46-11633, U.K. 1252917.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971. CAN. 939733, JAP. 48-34774, U.K. 1261752.
3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

Class 5I1

3,537,427.—ELECTROSTATIC LATENT IMAGE DEVELOPING DEVICE. NOV. 3, 1930. BEL. 722040, JAP. 46-14440, U.K. 1239635.
3,607,342.—METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 21, 1971. BEL. 707253, FRA. 1555753, JAP. 44-9878, U.K. 1204548.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5J

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 937783, U.K. 1328313.

Class 5J1

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 741.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, U.K. 1292200.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720
3,836,384.—IMAGING SYSTEMS. SEPT 17, 1974. JAP. 46-43198.

Class 5J2

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5J3

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,672,330.—APPARATUS FOR DEVELOPING A LATENT ELECTROSTATIC IMAGE. JUNE 27, 1972. BEL. 708760, FRA. 149128, U.K. 1192600.

Class 5J5

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.
3,981,268.—DEVICE FOR CONTROLLING ELECTRIC POTENTIAL APPLIED TO DEVELOPING ELECTRODE IN AN ELECTROPHOTOGRAPHIC DUPLICATOR. SEPT. 21, 1976. GER. P2526802.4, JAP. 49-47554, KOR. 3672, TIW. 6410621, U.K. 24745-75.

Class 5K

3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

Class 5M

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 471.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,773,507.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS EMPLOYING A PRETONER. NOV. 20, 1973. AUS. 426720, BEL. 769893, CAN. 947812, FRA. 7124853, ITL. 934605, JAP. 49-5465, U.K. 1340947.

Class 5N

3,764,312.—ELECTROPHOTOGRAPHIC PROCESS. OCT. 9, 1973. FRA. 7146405, JAP. 49-26903.

Class 5N2B

4,020,192.—XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREIN. APR. 26, 1977. FRA. 7430644, GER. P2443013.1, JAP. 48-101085, U.K. 39509.

Class 5N5

3,941,898.—DEVELOPING METHOD UTILIZING PULVERIZED, COLORED, CROSSLINKED, VINYLIC POLYMER RESIN AS TONER. MAR. 2, 1976.

Class 5O

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.
3,565,613.—ELECTROLYTIC ELECTROPHOTOGRAPHY. FEB. 23, 1971. GER. 1597849, JAP. 44-13679, U.K. 1202409.

Class 6BI

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.
3,927,877.—PAPER FEED TRAY FOR USE WITH COPYING MACHINE AND THE LIKE. DEC. 23, 1975.

Class 6C

3,901,427.—COPY PAPER FEEDER. AUG. 26, 1975.

Class 6D

3,924,848.—PAPER FEED APPARATUS FOR GRIPPER-TYPE PAPER TRANSPORT DEVICE. DEC. 9, 1975.
3,924,849.—PAPER GRIPPING DEVICE FOR USE WITH A CHAIN DRIVEN PAPER CARRIAGE. DEC. 9, 1975.

Class 6H

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 7C

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 7E1

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

Class 7E3A

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.
3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924,951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

Class 8A

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 8AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 8A1B

3,818,185.—HEAT FUSION-BONDING APPARATUS FOR ELECTROPHOTOGRAPHY. JUNE 18, 1974.
3,916,256.—PROTECTIVE CIRCUIT IN A TEMPERATURE REGULATOR FOR THE THERMAL FIXING DEVICE OF A DUPLICATOR. NOV. 4, 1975.

Class 8A2

3,904,786.—PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR. SEPT. 9, 1975.
3,981,269.—FIXING DEVICE FOR ELECTROPHOTOGRAPHIC DUPLICATING MACHINES. SEPT. 21, 1976. GER. P2507365.8, JAP. 31159, KOR. 3389, U.K. 5395-75.

Class 8A2A

3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.

Class 8B

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF A METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

Class 8C

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 9A

3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970. FRA. 1,474,687, ITL. 782,665, JAP. 44-12197, U.K. 1,143,923.
3,936,183.—ELECTROPHOTOGRAPHIC COPYING MACHINE WITH IMPROVED CLEANING BLADE. FEB. 3, 1976.

Class 9A1

3,766,592.—DRUM CLEANING DEVICE FOR AN ELECTROPHOTOGRAPHIC DUPLICATOR. OCT. 23, 1973.

Class 9B3

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.
3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

Class 10A, 10E

3,922,662.—DETECTOR FOR USE WITH A DUPLICATOR OR THE LIKE FOR DETECTING INCORRECTLY ALIGNED DOCUMENTS. NOV. 25, 1975.

Class 14A5

3,937,883.—BRAKING CIRCUIT FOR USE WITH PHASE SYNCHRONIZING CIRCUITRY. FEB. 10, 1976.

Class 15

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 15C

4,058,800.—IMAGE PICKUP ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES. NOV. 15, 1977. JAP. P49-137738.
4,054,866.—CONVERSION ELEMENT AND SYSTEM UTILIZING MAGNETIC BUBBLES. OCT. 18, 1977. JAP. P50-077558.

Class 17B1

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972. CAN. 931204, U.K. 1350795.

Class 17D3

3,936,664.—METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS. FEB. 3, 1976.

Class 18A

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238. JAP. 40-26402, U.K. 1,081,324.
3,730,711.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAY 1, 1973. BEL. 754699, CAN. 925087, FRA. 754699, GER. 2040152, JAP. 48-32381, U.K. 1272720.
3,799,340.—REFINING PHOTOCONDUCTIVE PARTICLE. MAR. 26, 1974. BEL. 776110, CAN. 944204, FRA. 714325.

Class 18A1

3,589,928.—PROCESS FOR THE PRODUCTION OF A LIGHT SENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY. JUNE 29, 1971. BEL. 685072, FRA. 1500187, GER. 1,522,603, JAP. 44-23775, U.K. 1139532.
3,607,363.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL. SEPT. 21, 1971. U.K. 1210071.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.
3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAIN-

ING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973. AUS. 451254, FRA. 71.09434, JAP. 48-43157, U.K. 1341627.

3,743,537.—METHOD OF MAKING ELECTROPHOTOGRAPHIC RECORDING MEMBER. JULY 3, 1973. AUS. 430736, ATR. 305766, BEL. 757.393, CAN. 928165, FRA. 7037234, ITL. 917004, JAP. 49-3846, U.K. 1269306.

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973. AUS. 443292, CAN. 925743, JAP. 48-7820, U.K. 1284646.

3,803,011.—PROCESS FOR PREPARING 2, 3-DIHYDRO-1H,6H-1,5-BENZODIAZOCINE-2-ONE DERIVATIVE. APR. 9, 1974.

Class 18A2

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A3

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

3,661,572.—MANUFACTURING PROCESS FOR MANUFACTURING ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL. MAY 9, 1972. AUS. 429948, BEL. 754323, CAN. 754323, FRA. 7028557, GER. 2038762, ITL. 902691, U.K. 1305298.

Class 18B

3,548,035.—SUSPENSION POLYMERIZATION PROCESS. DEC. 15, 1970. FRA. 1559138, GER. 1720782, JAP. 45-40052, U.K. 1185775.

3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,697,266.—ORGANIC PHOTOCONDUCTIVE MATERIALS FOR ELECTROPHOTOGRAPHY. OCT. 10, 1972. BEL. 761043, CAN. 915493, FRA. 2074451, ITL. 913992, JAP. 48-38429, U.K. 1323109.

3,716,505.—PROCESS FOR SUSPENSION POLYMERIZATION. FEB. 13, 1973. FRA. 2048682, GER. 2025104, JAP. 47-23406, U.K. 1316693.

Class 18C

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 18C2A1

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 18C2A2

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

Class 18C5A

3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

Class 20A3

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430722, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.

Class 20B3

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20C

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

Class 20C2

3,753,466.—AUTOMATIC FIRE EXTINGUISHER IN ELECTROPHOTOGRAPHIC COPYING MACHINE OR THE LIKE. AUG. 21, 1973. U.K. 1334579.

Class 20C4

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 20D

3,653,292.—AUTOMATIC CONTOUR TRACING DEVICE. APR. 4, 1972. FRA. 7204547, GER. 2033094, U.K. 1295128.

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 20D1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

Class 20G

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 20I

3,341,664.—METAL DRAWING APPARATUS. APR. 24, 1974.

Class 25A4

3,952,167.—ELECTROMAGNETIC COUPLER FOR USE WITH A TELEPHONE SET. APR. 20, 1976.

Class 25C2

3,341,631.—CIRCUIT INTERRUPTER. APR. 24, 1974. BEL. 764267, CAN. 932954, FRA. 7109086.

3,846,647.—TRIGGER CIRCUIT FOR USE WITH MULTIVIBRATORS. NOV. 5, 1974.

Class 25C4

3,838,344.—FREQUENCY MULTIPLYING CIRCUIT. SEPT 24, 1974.

Class 25C5

3,936,675.—REFERENCE POINT POTENTIAL COMPENSATING CIRCUIT FOR USE WITH PHASE CONTROLLER. FEB. 3, 1976.

Class 27D

3,779,206.—APPARATUS FOR SCRAPING LIQUID OFF OF SHEET MATERIAL. DEC. 18, 1973.

Class 32

3,813,262.—RESIN-IMPREGNATED TISSUE OVERLAYS. MAY 28, 1974. BEL. 777312, FRA. 7146406, ITL. 945655.

Class 32B

3,273,450.—DATA PROCESSING APPARATUS. NOV. 15, 1963. FRA. 1384061, GER. 1449563, GRB. 1048048, JAP. 629392.

Xerox Patents

Class 1

4,043,549.—IMPACT FEEDER. AUG. 23, 1977
4,060,105.—TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER. NOV. 29, 1977

Class 1A

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.
3,954,951.—PREPARATION OF RED AMORPHOUS SELENIUM. MAY 4, 1976.
3,961,954.—ACID SENSITIZED CHARGE TRANSFER COMPLEXES AND CYCLIC ELECTRSTATOGRAPHC IMAGNG METH-ACID SENSITIZATN. JUNE 8, 1976. CAN. 1002366.
4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,924.—IMAGING SURFACE SMOOTHING WITH ROUGHENED FOIL NICKEL. MAR. 14, 1978.
4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 1A 1

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.
3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.
3,928,036.—FLEXIBLE XEROGRAPHIC PHOTORECEPTOR ELEMENT. DEC. 23, 1975.
3,981,728.—XEROGRAPHIC IMAGING MEMBER HAVING HEXAGONAL SELENIUM IN INTER-LOCKING CONTINUOUS PATHS. SEPT. 21, 1971.

Class 1A 1A

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME— HORIZONS. MAY 12, 1959. CAN. 0621931.
2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.
3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.
3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
3,930,853.—ACCELERATING AGING METHOD FOR SELENIUM ARSENIC PHOTOCONDUCTORS. JAN. 6, 1976.
4,013,463.—PHOTORECEPTOR FABRICATION UTILIZING AC ION PLATING. MAR. 22, 1977.
4,150,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,109,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,072,518.—METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE. FEB. 7, 1978.
4,075,013.—ELECTROPHOTOCHEMICAL PREPARATION OF SELENIUM PHOTOCONDUCTIVE MEMBERS. FEB. 21, 1978.
4,098,655.—METHOD FOR FABRICATING A PHOTORECEPTOR. JULY 4, 1978.

Class 1A 1B

2,745,327.—ELECTROPHOTOGRAPHIC PROCESS. MAY 15, 1956.
2,803,542.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0603581, FRA. 1181499, GRB. 0876569.
2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.
3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,355,289.—CYCLICAL XEROGRAPHIC PROCESSD UTILIZING A SELENIUM-TELLURIUM XEROGRAPHIC PLATE. NOV. 28, 1967.
3,427,157.—XEROGRAPHIC PROCESS UTILIZING A PHOTOCONDUCTIVE ALLOY OF THALLIUM IN SELNIUM. FEB. 11, 1969. CAN. 0834085, FRA. 1461161, GRB. 1132993, HOL. 0150924, ITL. 0749553, JAP. 0534762, MEX. 0085232.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237, ITL. 0815227, JAP. 0632160.
3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.
3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.
3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.
3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
3,709,683.—INFRARED SENSITIVE IMAGE RETENTION PHOTORECEPTOR. JAN. 9, 1973.
3,874,917.—METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM. APR. 1, 1975.
4,015,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.
4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 1A 1C

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

3,121,006.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964. ARG. 0147758, BEL. 0656892, CAN. 0674311, CHL. 0020455, CLB. 0014118, ECD. 0000029, GUA. 0001696, PRU. 0009656, TRK. 0012835, URG. 0006526, VZL. 0016353.

3,121,007.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,151,982.—XEROGRAPHIC PLATE. OCT. 6, 1964. ARG. 0149584, ATR. 0247148, AUS. 0275834, BEL. 0630478, BRA. 0088013, CAN. 0879017, DNK. 0116787, FRA. 1359402, GER. 1497054, GRB. 1049872, GRK. 0026268, HOL. 0139212, IND. 0086999, ISR. 0018877, ITL. 0701505, JAP. 0489512, LXB. 0043461, MEX. 0081663, NOR. 0108058, NZL. 0134420, PTG. 0040700, SAF. 0001331, SPN. 0286492, STZ. 0450173, SWD. 0313998.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,519,420.—METHOD OF CHARGING A ZINC OXIDE PHOTOCONDUCTIVE LAYER WITH A POSITIVE CHARGE. JULY 7, 1970.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,941,594.—ELECTROPHOTOGRAPHIC ELEMENT WITH ZNO AND TIO2. MAR. 2, 1976.

3,969,113.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY CONTAINING TITANIUM OXIDE AND A CADMIUM PIGMENT. JULY 13, 1976.

3,975,306.—METHOD FOR IMPROVING THE PHOTOINDUCED DISCHARGE CHARACTERISTICS OF CERTAIN CADMIUM CHALOCOGENIDE. AUG. 17, 1976.

Class 1A 1E

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

Class 1A 1F

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,507,646.—ELECTROPHOTOGRAPHIC PROCESS USING A SINGLE PHASE PHOTOCONDUCTIVE GLASS IMAGING LAYER. APR. 21, 1970. ARG. 0164449, AUS. 0416137, BEL. 0691757, CAN. 0818383, FRA. 1511172, GER. 1522713, GRB. 1167520, ITL. 0787661, JAP. 0567233, MEX. 0105237, SPN. 0334896, STZ. 0472707, SWD. 0331793, VZL. 0024006.

3,565,713.—METHOD OF FORMING A CERAMIC IMAGE ON A CERAMIC SUBSTRATE. FEB. 23, 1971.

Class 1A 2

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV 26, 1974.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 740836, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALIZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

4,043,812.—A PROCESS FOR PREPARATION OF 2-ANTHRYL & SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLY. AUG. 23, 1977. BEL. 822305, FRA. 7527053, STZ. 32598.

4,050,934.—ELECTRON ACCEPTOR MONOMERS & POLYMERS. SEPT. 27, 1977.

4,056,391.—METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHO. NOV. 1, 1977.

Class 1A 2A

3,081165.—XEROGRAPHIC CHEMOGRAPHY. MAR. 12, 1963. CAN. 0618594, GRB. 0977904.

3,357,989.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-SEE D2167 FOR RE27117. DEC. 12, 1967. CAN. 0860929, FRA. 1508173, GRB. 1169901, ITL. 0787592, JAP. 0560090, MEX. 0101543.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODIOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,225.—ELECTROPHOTOGRAPHIC IMAGING PROCESS. MAY 20, 1969. CAN. 0846121.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. ATR. 0279351, AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,615,409.—ELCTROPHOTOGRPHC PLATE AND PROCESS EMPLOYING A PHOTODNDCTV PIGMNT OF GENERAL FORMULA R2 N4 S3. OCT. 26, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,789,216.—PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE. JAN. 29, 1974.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 003956.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,989,860.—REPAIR TECHNIQUE FOR PHOTORECEPTOR. NOV. 2, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE AND PROCESS. FEB. 1, 1977.

4,012,122.—LIQUID CRYSTALLINE PLATEN FOR A ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 15, 1977.

4,046,563.—PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYRENE, ARTICLE AND PROCESS OF USE. SEPT. 6, 1977. FRA. 7509147.

4,055,420.—SINGLE PHASE ORGANIC PHOTOCONDUCTIVE COMPOSITION. OCT. 25, 1977.

4,072,519.—PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT. FEB. 7, 1978. FRA. 7509146.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978. AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

Class 1A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GER. 1522679, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT.29,1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,536,482.—ELECTROPHOTOGRPHC IMG SYS INCL A HALOGEN TREATMENT STOP FOR MAKING BCKGRND AREAS TRANSPARENT. OCT. 27, 1970.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 0033956.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1010430.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,062,886.—FLUORENONE CARBOXYLE ACID ESTERS. DEC. 13, 1977. FRA. 7621895.

4,069,046.—POLYMERIZED VINYL CARBAZOLES SENSITIZED BY NITRO-SUBSTITUTED 9-DICYANOMETHYLENE FLUORENES. JAN. 17, 1978.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978.

AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

Class 1A 2C

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,961,948.—PHOTOCHROMIC IMAGING METHOD. JUNE 8, 1976.

Class 1A 2D

3,518,081.—IMAGE FORMATION AND DEVELOPMENT - REISSUED D 857R. JUNE 30, 1970. CAN. 0801270, GRB. 1085573.

RE29,357.—IMAGE FORMATION AND DEVELOPMENT—REISSUE OF 3,518,081—D 857. AUG. 16, 1977. CAN. 801270, GRB. 1085573.

Class 1A 3

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,723,110.—ELECTROPHOTOGRAPHIC PROCESS. MAR. 27, 1973.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23, 1977.

Class 1A 4

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME - HORIZONS. MAY 12, 1959. CAN. 0621931.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,816,115.—METHOD FOR FORMING A PLURALITY OF ELECTROSTATIC LATENT IMAGES ON AN ELECTROPHOTOGRAPHIC PLATE. JUNE 11, 1974.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1,010,430.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,063,943.—ELECTROSTATOGRAPHIC IMAGING METHOD. DEC. 20, 1977.

4,063,945.—ELECTROSTATOGRAPHIC IMAGING METHOD. DEC. 20, 1977.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978.AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

Class 1A 5

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464/92, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLO. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,947,184.—IMAGING METHOD. MAR. 30, 1976.

3,972,718.—ELECTROSTATOGRAPHIC GRAVURE MEMBER. AUG. 3, 1976.

Class 1A 6

3,003,869.—XEROGRAPHIC PLATE OF HIGH QUANTUM EFFICIENCY. OCT. 10, 1961.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,684,500.—METHOD OF FORMING PERMANENT ELECTROSTATIC IMAGE WITH TWO-LAYERED PHOTORECEPTOR. AUG. 15, 1972.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,994,791.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. NOV. 30, 1976.

4,049,449.—METHOD FOR FORMING AN ELECTROPHOTOGRAPHIC MEMBER. SEPT. 20, 1977.

Class 1B

3,730,453.—EARLY END-OF-TAPE DETECTION. MAY 1, 1973. CAN. 0939052, GRB. 1354581.

3,889,292.—APPARATUS FOR MAKING MULTIPLE ALPHANURMIC COPIES OF A BINARY CODED MESSAGE. JUNE 10, 1975. CAN. 0986572.

4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

4,076,858.—ELECTROSTATIC COPYING PROCESS WITH CHARGING OF THE ORIGINAL. FEB. 28, 1978.

Class 1B 1

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,244,546.—ELECTROSTATIC IMAGE REPRODUCTION. APR. 5, 1966. CAN. 0847532, GRB. 1040371, JAP. 0477223.
3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.
3,518,698.—IMAGING SYSTEM. JUNE 30, 1970. CAN. 0905481, FRA. 1542838, GRB. 1200804, JAP. 0604154, MEX. 0099911.
3,561,957.—ELECTROPHOTOGRAPHIC PROCESS USING A HIGH INTENSITY ELECTROMAGNETIC RADIATION SOURCE. FEB. 9, 1971. CAN. 0914266, GRB. 1207361.
3,631,507.—METHOD OF REDISTRIBUTING CHARGE ON A DIELECTRIC MEDIUM. DEC. 28, 1971.
3,677,750.—PHOTOELECTROSOLOGRAPHIC IMAGING. JULY 18, 1972. GRB. 1326934.
3,686,678.—DUAL MODE ELECTROSTATIC PRINTING. AUG. 22, 1972. BEL. 0747125, CAN. 0952574, FRA. 7007650, GRB. 1297996, JAP. 0753534.
3,693,185.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. SEPT. 19, 1972.
3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973.
3,729,123.—PRINTING MACHINE AND METHOD. APR. 24, 1973. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,793,107.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. FEB. 19, 1974.
3,829,185.—HOUSING ASSEMBLY FOR ELECTROSTATIC PRINTING MACHINE. AUG. 13, 1974.
3,854,942.—TRANSPARENCY FOR MULTI-COLOR ELECTROSTATIC COPYING. DEC. 17, 1974.
3,859,960.—PRINTING MACHINE WITH ELECTROSTATIC WEB DEVELOPING APPARATUS. JAN. 14, 1975. CAN. 0959532, FRA. 7142517, GRB. 1348014.
3,937,177.—ELECTROSTATIC PRINTING MACHINE WITH IMPROVED TONER FOUNTAIN AND RECOVERY, FEB. 10, 1976 .
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.
4,042,939.—PRINTER/PLOTTER STYLE SYSTEM FOR CONFINED INSTALLATION AND METHOD. AUG. 16, 1977.

Class 1B 2

2,817,277.—ELECTROPHOTOGRAPHIC CAMERA. DEC. 24, 1957.
3,057,719.—PROCESS FOR FORMING ELECTROSTATIC IMAGES. OCT. 9, 1962. GRB. 0947039.
3,084,061.—METHOD FOR FORMATION OF ELECTROSTATIC IMAGE. APR. 2, 1963. CAN. 0607290.
3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGEFORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.
3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.
3,551,146.—INDUCTION IMAGING SYSTEM. DEC. 29, 1970.
3,703,376.—INDUCTION SYSTEM. NOV. 21, 1972. ARG. 0190247, MEX. 0123032.
3,738,855.—INDUCTION IMAGING SYSTEM. JUNE 12, 1973.
3,778,841.—INDUCTION IMAGING SYSTEM. DEC. 11, 1973. ARG. 0190247, MEX. 0123032.
3,953,206.—IMAGING METHOD. APR. 27, 1976.
4,050,804.—LIQUID INK IMAGING SYSTEM. SEPT. 27, 1977.
4,056,314.—LIQUID INK IMAGING SYSTEM. NOV. 1, 1977.
4,076,405.—LIQUID INK IMAGING SYSTEM. FEB. 28, 1978.

Class 1B 3

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.
3,043,217.—ELECTROSTATIC PRINTING APPARATUS. JULY 10, 1962.
3,145,655.—EQUIPOTENTIAL XEROPRINTING MEMBER AND PROCESS OF PRINTING THERE WITH. AUG. 25, 1964. CAN. 0784647, GER. 1287095, GRB. 0958964, JAP. 0591209.
3,160,091.—HIGH SPEED XEROPRINTER AND METHOD THEREFOR. DEC. 8, 1964. GRB. 0978349.
3,318,698.—XEROPRINTING REPRODUCTION. MAY 9, 1967. CAN. 0790236, FRA. 1394421, GRB. 1055323, ITL. 0801547, JAP. 0504497.
3,515,584.—XEROPRINTING MASTER. JUNE 2, 1970. CAN. 0882600, GRB. 1204246, JAP. 0659019.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0879118, JAP. 0713808.
3,967,818.—DUPLICATING SYSTEM. JULY 6, 1976.
4,047,945.—XEROPRINTING MASTER AND PROCESS. SEPT. 13, 1977.

Class 1B 4A

2,825,814.—XEROGRAPHIC IMAGE FORMATION. MAR. 4, 1958. ARG. 0105238, AUS. 0203970, BRA. 0052412, CAN. 0564673, SAF. 0021814, SWD. 0200906.
2,937,943.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 24, 1960. CAN. 0680751.
2,982,647.—ELECTROSTATIC IMAGE REPRODUCTION. MAY 2, 1961.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,653,891.—FORMS OVERLAY TECHNIQUE USING TESI. APR. 4, 1972. ARG. 0184314, AUS. 0459354, BEL. 0761030, CAN. 0946912, FRA. 7047635, GRB. 1339714, ITL. 0913996, MEX. 0119467.
4,023,895.—ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 1B 4B

2,919,967.—HIGH-SPEED ELECTROSTATIC ALPHANUMERICAL PRINTER. JAN. 5, 1960. CAN. 0682116, GER. 1199033, GRB. 0889663.
2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.
3,023,731.—ELECTROSTATIC ALPHANUMERICAL PRINTER WITH IMAGE TRANSFER MECHANISM. MAR. 6, 1962. CAN. 0622350, GRB. 0889664.
3,045,587.—ELECTROSTATIC PRINTING APPARATUS FOR FORMING MULTIPLE COPIES. JULY 24, 1962. CAN. 0682115, GRB. 0888867.
3,045,644.—TWO-COLOR ELECTROSTATIC PRINTING APPARATUS. JULY 24, 1962. CAN. 0634187, GRB. 0886766.
3,060,432.—ELECTROSTATIC RECORDING OF INFORMATION. OCT. 23, 1962.
3,064,259.—ELECTROSTATIC RECORDING OF INFORMATION. NOV. 13, 1962. CAN. 0736628.
3,068,481.—PROCESS AND APPARATUS FOR TESI-PRINTING. DEC. 11, 1962. CAN. 0709093, GRB. 0987234, JAP. 0446814.
3,091,762.—ELECTROSTATIC APPARATUS FOR MEASURING AND RECORDING TIME INTERVALS. MAY 28, 1963. CAN. 0620988, FRA. 1202341, GER. 1252149, GRB. 0880725, ITL. 0585388.
3,182,591.—IMAGE FORMING APPARATUS AND METHOD. MAY 11, 1965.
3,208,076.—ELECTROSTATIC PRINTER. SEPT. 21, 1965. GRB. 0999260.
3,217,330.—ELECTROSTATIC PRINTING UTILIZING PRINT-THROUGH RECORDING. NOV. 9, 1965. CAN. 0773752, GRB. 1001152.
3,234,359.—RECORD CARD SCANNING APPARATUS. FEB. 8, 1966.
3,234,904.—DEVICE FOR TESIPRINTING. FEB. 15, 1966. AUS. 0277492, CAN. 0804878, FRA. 1367728, GRB. 1024635, ITL. 0697883.
3,257,222.—ELECTROSTATIC RECORDING METHOD AND APPARATUS USING SHAPED ELECTRODES. JUNE 21, 1966. CAN. 0736231, GRB. 1027438, JAP. 0451019.
3,289,209.—ELECTROSTATIC MATRIX PRINTER. NOV. 29, 1966. CAN. 0707049, FRA. 1357858, GER. 1447873, GRB. 1018513, ITL. 0694321, JAP. 0440456.
3,342,126.—MULTIPLE ELECTROGRAPHIC PRINTER HAVING PLURAL UNITS CONNECTED TO COMMON DRIVE MEANS. SEPT. 19, 1967. CAN. 0825341, GRB. 1182685, JAP. 0648073.

3,348,232.—ASYNCHRONOUS PAGE-AT-A-TIME PRINTER. OCT. 17, 1967. CAN. 0709971, GRB. 1025487, JAP. 0462803.

3,358,592.—ELECTROGRAPHIC PRINTING. DEC. 19, 1967. CAN. 0896701, FRA. 1514749, GER. 1512401, GRB. 1182686, ITL. 0793834, MEX. 0098070.

3,430,254.—TESI PRINTING WITH FLEXIBLE ELECTRODE ON ENDLESS BELT. FEB. 25, 1969.

3,438,052.—AIR-SUPPORTED HOUSING CONTAINING TESI PRINTING DRUM. APR. 8, 1969. CAN. 0827330, GRB. 1149349.

3,495,269.—ELECTROGRAPHIC RECORDG METH AND APPRTS W/INERT GASEOUS DISCHARGE IONIZATION AND ACCELERATION GAPS. FEB. 10, 1970. ARG. 0174765, ATR. 0309208, AUS. 0413341, BEL. 0707986, CAN. 0865837, CZC. 0164808, FRA. 1551296, GRB. 1205790, ITL. 0819587, JAP. 0587936, MEX. 0103538, SPN. 0348328, SWD. 0346867, USR. 0291520.

3,599,225.—ELECTROSTATIC RECORDING APPARATUS - AIR GAP APERTURE BELT COMMUNICATIONS PRINTER. AUG. 10, 1971. CAN. 0882319, GRB. 1226436, JAP. 0675796.

3,644,930.—MULTI-STYLUS RECORDER. FEB. 22, 1972. ARG. 0181835, AUS. 0457379, BEL. 0751150, CAN. 0944812, CHL. 0025752, FRA. 7019463, GRB. 1297110, ITL. 0893693, MEX. 0119071, SPN. 0380273, SWD. 0368289, TIW. 0005822, VZL. 0027516.

3,673,600.—ELECTROGRAPHIC RECORDING METHOD AND APPARATUS. JUNE 27, 1972. CAN. 0947361, GRB. 1318605.

3,673,603.—RECIPROCATING CARRIAGE FOR ELECTROGRAPHIC PRINTING. JUNE 27, 1972. CAN. 0937629, GRB. 1346647.

3,686,676.—DUAL MODE ELECTROGRAPHIC RECORDER. AUG. 22, 1972. CAN. 0954293.

3,686,679.—MULTI-STYLUS RECORDING ASSEMBLY. AUG. 22, 1972.

3,714,665.—ELECTROSTATIC RECORDING WITH IMPROVED ELECTROSTATIC CHARGE RETENTION. JAN. 30, 1973.

3,717,880.—DUAL MODE ELECTROGRAPHIC RECORDING. FEB. 20, 1973. BEL. 0774564, CAN. 0948271, FRA. 7139638, GRB. 1366129, ITL. 0937674.

3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWD. 7216975.

3,771,184.—PRINTING APPARATUS. NOV. 13, 1973. CAN. 0973704, FRA. 7246858, GRB. 1415200, ITL. 0973321, SWD. 7216973.

3,795,010.—WRITING APPARATUS AND METHOD OF MANUFACTURE. FEB. 26, 1974.

3,806,238.—FORMS OVERLAY TECHNIQUE USING TEST. APR. 23, 1974.

3,811,766.—DEVELOPING APPARATUS. MAY 21, 1974. ARG. 0183333, AUS. 0446187, BEL. 0747127, CAN. 0879412, EGR. 0084803, FRA. 7008249, GRB. 1296417, ITL. 0898245, JAP. 0770134, MEX. 0112930, SPN. 0377301, STZ. 0521614, SWD. 0361749, TIW. 0006826, USR. 0352484.

3,875,578.—ENVELOPED STYLUS RECORDER. APR. 1, 1975. CAN. 0947360, FRA. 7008242, GRB. 1296416.

3,971,042.—WRITING APPARATUS AND METHOD OF MANUFACTURE. JULY 20, 1976.

Class 1C

4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.

Class 1C 1

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.

3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.

3,437,020.—MICROFILM TITLING APPARATUS. APR. 8, 1969. CAN. 0837780, GRB. 1191019, JAP. 0572188.

3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.

3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 6872518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

Class 1C 2

2,816,493.—ELECTROPHOTOGRAPHIC MICROFILM ENLARGER DEC. 17, 1957.

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.

3,379,106.—XEROGRAPHIC REPRODUCTION APPARATUS. APR. 23, 1968. ATR. 0300567, AUS. 0416116, BEL. 0674602, CAN. 0821718, DNK. 0117045, FRA. 1475712, GRB. 1135742, ITL. 0750206, MEX. 0095580, SPN. 0321099, STZ. 0509924, SWD. 6912065.

3,480,360.—XEROGRAPHIC COPYING APPARATUS. NOV. 25, 1969. ARG. 0180571, ATR. 0301344, AUS. 0310556, BEL. 0704978, CAN. 0870794, CHL. 0023569, FRA. 1540839, GRB. 1206964, GRK. 0035147, HUN. 0158496, IND. 0112715, ITL. 0827017, LXB. 0054635, MEX. 0102269, NZL. 0156632, PRU. 0009341, PTG. 0048460, SAF. 0676065, SPN. 0345998, STZ. 0487439, SWD. 0337743, URG. 0008847, VZL. 0023675.

3,592,539.—RECORDING APPARATUS. JULY 13, 1971. CAN. 0917230.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 3

3,130,411.—ELECTRONIC RECORDER. APR. 21, 1964. CAN. 0729326.

3,212,888.—METHOD FOR DEVELOPING LATENT ELECTROSTATIC CHARGE HALFTONE IMAGES. OCT. 19, 1965. GER. 1284302, GRB. 1017683, JAP. 0470423.

3,281,857.—XEROGRAPHIC TRANSFER PLATEN. OCT. 25, 1966. CAN. 0733683, GRB. 1025199.

3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,873,310.—METHOD OF CONTROLLING THE BRIGHTNESS ACCEPTANCE RANGE AND TONAL CONTRAST OF XEROGRAPHIC PLATE. MAR. 25, 1975. GRB. 1414951.

3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975. GRB. 1459558.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975. GRB. 1459558.

4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.

4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.

4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.

4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23, 1977.

4,051,536.—ELECTRONIC HALFTONE IMAGING SYSTEM. SEPT. 27, 1977.

4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.

4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.

4,072,414.—SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 7, 1978.

4,080,055.—A HALF-TONE COLOR COPIER. MAR. 21, 1978.

4,083,632.—MULTI FREQUENCY SCREEN. APR. 11, 1978.

4,090,786.—MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. MAY 23, 1978.

4,095,889.—EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 20, 1978.

Class 1C 4

3,196,009.—ELECTROSTATIC IMAGE LIQUID DEFORMATION DEVELOPMENT. JULY 20, 1965. ATR. 0267320, AUS. 0273895, BEL. 0631984, CAN. 0768329, DNK. 0129676, FRA. 1408156, GER. 1497058, GRB. 1043981, HOL. 0134043, ISR. 0019144, ITL. 0695213, JAP. 0620918, LXB. 0043704, MEX. 0080571, NOR. 0123260, SAF. 0001947, STZ. 0448745, SWD. 0315502.

3,196,010.—ELECTROPHOTOGRAPHIC PROCESS FOR FORMATION OF DEFORMATION IMAGES IN DEFORMABLE INTERFERENCE FILM. JULY 20, 1965. CAN. 0790232, FRA. 1364100, GRB. 1036738, ITL. 0695214, JAP. 0510166.

3,196,012.—HALF-TONE XEROGRAPHY WITH THERMOPLASTIC DEFORMATION OF THE IMAGE. JULY 20, 1965. CAN. 0760623, FRA. 1359565, GER. 1497060, GRB. 1040836, ITL. 0697483, JAP. 0478444.

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,419,885.—IMAGE DEVELOPMENT OF THERMOPLASTIC LAYERS. DEC. 31, 1968. CAN. 0785985, GRB. 1117644, JAP. 0537663.

3,436,216.—IMAGE STORAGE COMPRISING A THERMOPLASTIC DEFORMATION PATTERN. APR. 1, 1969. CAN. 0807326, FRA. 1488094, GRB. 1160731, ITL. 0774940.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,698,892.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. OCT. 17, 1972. CAN. 0949117, GRB. 1343191.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,716,359.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. FEB. 13, 1973. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,719,483.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. MAR. 6, 1973.

3,730,621.—CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM. MAY 1, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,842,406.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. OCT. 15, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,858,973.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. JAN. 7, 1975. CAN. 0949117, GRB. 1343191.

3,888,591.—IMAGE SUBTRACTION APPARATUS. JUNE 10, 1975.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,433.—PHASE IMAGE SCANNING METHOD. MAR. 23, 1976. BEL. 0835551.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,961,950.—IMAGING SYSTEM. JUNE 8, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

3,999,988.—METHOD FOR REAL-TIME COLOR MASKING. DEC. 28, 1976.

4,018,603.—DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS. APR. 19, 1977.

4,021,236.—IMAGING SYSTEM. MAY 3, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,065,308.—DEFORMATION IMAGING ELEMENT. DEC. 27, 1977.

4,079,421.—IMAGE SCANNING SYSTEM. MAR. 14, 1978. BEL. 835551, SPN. 442965.

Class 1C 4A

3,196,008.—ELECTROPC PRCS FOR FRMTN OF FRST LIKE DEFRMTN IMGS IN MECHANICALLY DEFRMBL PHOTOCONDUCTIVE LAYER. JULY 20, 1965. CAN. 0844221.

3,196,011.—ELECTROSTATIC FROSTING. JULY 20, 1965. ARG. 0150575, ATR. 0256625, AUS. 0275848, BEL. 0631983, BRA. 0082433, CAN. 0918226, CHL. 0019655, EIR. 0027268, FIN. 0044982, FRA. 1364101, GER. 1295371, GRB. 1039881, GRK. 0026981, HOL. 0140635, IND. 0087685, ISR. 0019143, ITL. 0695215, LXR. 0043693, MEX. 0102124, NOR. 0118346, NZL. 0134799, PAK. 0114430, PLP. 0003269, PTG. 0040894, SAF. 0001948, SPN. 0292129, STZ. 0425467, SWD. 0315201, TRK. 0011937, UAR. 0004997, VTM. 0000992, VZL. 0014488.

3,213,429.—HIGH SPEED INFORMATION RECORDER. OCT. 19, 1965.

3,258,336.—STRIPPABLE LAYER FROST PRINTING. JUNE 28, 1966. CAN. 0815184.

3,322,034.—FROST COLOR DISPLAY. MAY 30, 1967.

3,329,500.—ELECTROSTATIC FROSTING. JULY 4, 1967.

3,482,969.—FIXING OF DEFORMATION IMAGES. DEC. 9, 1969. CAN. 0801883, FRA. 1399003, GRB. 1061235, ITL. 0726200, SWD. 0315806.

3,485,623.—CONTINUOUS TONE THERMOPLASTIC PHOTOGRAPHY. DEC. 23, 1969. CAN. 0810834, GRB. 1181093, JAP. 0565795.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,560,205.—METHOD OF FORMING A PHASE MODULATING HOLOGRAM ON A DEFORMABLE THERMOPLASTIC. FEB. 2, 1971. CAN. 0949793, GRB. 1162853.

3,560,206.—PRODUCTION OF LATENT PERODIC MEMORY PATTERNS IN FROSTABLE FILMS. FEB. 2, 1971.

3,561,958.—INDUCING FROST DEFORMATION IMAGING BY ELECTROLYTIC DEPOSITION. FEB. 9, 1971.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,764,311.—IMAGING SYSTEM. OCT. 9, 1973.

3,819,369.—SURFACE DEFORMABLE IMAGING MEMBER OF IMPROVED DARK DECAY CHARACTERISTICS. JUNE 25, 1974.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

Class 1C 4B

3,238,041.—RELIEF IMAGING OF PHOTORESPONSIVE MEMBER AND PRODUCT. MAR. 1, 1966. CAN. 0850841, GRB. 1043983, MEX. 0080410.

3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,615,388.—DEFORMATION IMAGING PROCESS AND ELEMENT. OCT. 26, 1971. CAN. 0941877, MEX. 0101539.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 5

2,817,765.—XEROGRAPHIC METHOD. DEC. 24, 1957.
2,968,553.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. CAN. 0624329.
3,519,818.—METHOD OF PREPARING A NEGATIVE XEROGRAPHIC REPRODUCTION FROM A POSITIVE LINE COPY IMAGE. JULY 7, 1970. CAN. 0829037, GRB. 1191159, JAP. 0589516.

Class 1D

3,318,212.—DUPLEX XEROGRAPHIC REPRODUCTION. MAY 9, 1967.
3,506,347.—DUPLEX XEROGRAPHIC REPRODUCTION APPARATUS. APR. 14, 1970.
3,536,398.—REPRODUCTION APPARATUS. OCT. 27, 1970. AUS. 0442047, BEL. 0737274, CAN. 0899443, EGR. 0091200, FRA. 6927759, GRB. 1246226, ITL. 0883645, SPN. 0370416, STZ. 0500517, SWD. 0356144, TIW. 0005358, USR. 0359871.
3,580,670.—APPARATUS FOR DUPLEXING. MAY 25, 1971. CAN. 0929581.
3,615,129.—DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH COPY SHEET REVERSING STATION. OCT. 26, 1971. ARG. 0172601, AUS. 0432830, BEL. 0737341, CAN. 0909853, CZC. 0158650, EGR. 0083299, FRA. 6927784, GRB. 1256767, ITL. 0883644, JAP. 0774495, MEX. 0108784, SPN. 0370415, STZ. 0500518, SWD. 0356143, TIW. 0006822, USR. 0371736, VZL. 0032923.
3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.
3,674,475.—ENCLOSED MIGRATION IMAGING SYSTEM. JULY 4, 1972.
3,694,073.—METHOD FOR DUPLEXING. SEPT. 26, 1972.
3,754,822.—SCANNING SYSTEM. AUG. 28, 1973.
3,844,653.—ROOF MIRROR COPYING SYSTEM. OCT. 29, 1974.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.
3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.
3,936,171.—ELECTROSTATOGRAPHIC METHODS AND APPARATUS. FEB. 3, 1976.
3,940,210.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. FEB. 24, 1976. BEL. 0832356, IRN. 0013436.
3,944,359.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. MAR. 16, 1976.
4,014,609.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINE. MAR. 29, 1977.
4,035,073.—DUPLEX REPRODUCTION MACHINE. JULY 12, 1977. BEL. 0832115, SPN. 0440012.

Class 1E

2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.
2,962,375.—COLOR XEROGRAPHY. NOV. 29, 1960.
3,043,686.—XEROGRAPHIC COLOR MASKING. JULY 10, 1962. CAN. 0663888.
3,057,720.—XEROGRAPHIC COLOR REPRODUCTION. OCT. 9, 1962. GRB. 0956772.
3,227,549.—MULTIPLE IMAGE FORMING XEROGRAPHIC REPRODUCTION PROCESS. JAN. 4, 1966.
3,313,623.—LINE SEQUENTIAL COLOR XEROGRAPHY. APR. 11, 1967. CAN. 0880483, GRB. 1019974.
3,316,805.—COLOR DISPLAY. MAY 2, 1967.
3,357,830.—DYED IMAGE XEROGRAPHY. DEC. 12, 1967. CAN. 0821484, GER. 1277018, GRB. 1016581, ITL. 0679720, JAP. 0477809.
3,373,091.—DATA STORAGE DEVICE AND METHOD. MAR. 12, 1968.
3,386,379.—DUPLICATING WITH COLOR PRODUCING REAGENTS. JUNE 4, 1968. AUS. 0294747, CAN. 0842445, FRA. 1390006, GER. 1249089, GRB. 1043875, ITL. 0801548, JAP. 0611643.
3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.
3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,583,806.—DYED IMAGE XEROGRAPHY. JUNE 8, 1971.
3,615,392.—ELECTROPHORETIC REPRODUCTION ORIGINAL CONTAINING BOTH MULTI-COLOR AND LINE AREAS. OCT. 26, 1971.
3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972.
3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 0932785.
3,690,756.—COLOR XEROGRAPHY. SEPT. 12, 1972. BEL. 0781001, CAN. 0963522, FRA. 7210584, GRB. 1365753, ITL. 0950399.
3,702,483.—COLOR RENDITION METHOD. NOV. 7, 1972. BEL. 0777015, CAN. 0935334, FRA. 7146255, GRB. 1361647, ITL. 0944210.
3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.
3,724,943.—COLOR REPRODUCTION APPARATUS. APR. 3, 1973. CAN. 0946463.
3,734,607.—COLOR REPRODUCTION APPARATUS. MAY 22, 1973. ARG. 0184654, ATR. 0314352, AUS. 0459724, BEL. 0751490, CAN. 0946462, CHL. 0026265, DNK. 0130156, EGR. 0085001, FRA. 7020455, GRB. 1316499, ITL. 0893863, MEX. 0120285, NZL. 0160302, PNM. 0002259, PTG. 0053890, SAF. 0703775, SPN. 0380376, STZ. 0514164, SWD. 0359176.
3,799,668.—COLOR STANDARD AND METHOD OF CALIBRATING A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 26, 1974. BEL. 0812179, SAF. 0741562.
3,799,774.—MULTI COLOR ELECTROPHOTOGRAPHIC MASKING PROCESS. MAR. 26, 1974.
3,805,283.—CHART CREATION APPARATUS. APR. 16, 1974.
3,869,203.—COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 4, 1975. BEL. 0820041.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,909,127.—MULTI-COLOR ORIGINAL FOR AN ELECTROPHOTOGRAPHIC PRINTING SYSTEM. SEPT. 30, 1975.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,936,182.—CONTROL ARRANGEMENT FOR AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS. FEB. 3, 1976.
3,944,711.—TRANSPARENCY. MAR. 16, 1976.
3,958,990.—TRANSFERRING TONER TO AN AMINE COATED SHEET. MAY 25, 1976.
3,960,445.—COLOR HIGHLIGHTING ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,963,341.—A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 15, 1976.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,999,987.—COLOR REPRODUCTION METHOD. DEC. 28, 1976.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,696.—MULTICOLORED XEROGRAPHIC TRANSPARENCY UTILIZING AN APIPHATIC ESTER COATING. MAR. 29, 1977.
4,027,962.—COLOR TRANSPARENCY REPRODUCING MACHINE. JUNE 7, 1977. BEL. 0830321, IRN. 0013435, SPN. 0437814.
4,040,828.—MULTICOLOR IMAGING METHOD AND IMAGED MEMBER EMPLOYING COMBINATION OF TRANSPARENT TONER AND. AUG. 9, 1977. FRA. 7540219.
4,045,218.—METHOD FOR ELECTROSTATICALLY PRODUCING A COLOR ACCENTED PHOTOCOPY. AUG. 30, 1977.
4,045,219.—METHOD OF REPRODUCING COLOR HIGHLIGHTED DOCUMENTS. AUG. 30, 1977.
4,053,216.—COLOR TRANSPARENCY REPRODUCING MACHINE. OCT. 11, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,053,217.—COLOR TRANSPARENCY REPRODUCING MACHINE. OCT. 11, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,058,850.—PROGRAMMABLE CONTROLLER. NOV. 15, 1977.
4,063,810.—COLOR TRANSPARENCY REPRODUCING MACHINE. DEC. 20, 1977. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,063,946.—ELECTROPHOTOGRAPHIC COLOR REPRODUCTION PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIAL WITH DUAL. DEC. 20, 1977.
4,068,938.—ELECTROSTATIC COLOR PRINTING USING DISCRETE POTENTIALS. JAN. 17, 1978. GRB. 1442234.
4,068,939.—COLOR TRANSPARENCY REPRODUCING MACHINE. JAN. 17, 1978. BEL. 830321, FRA. 7518443, GRB. 1489142, IRN. 13435, SPN. 437814, STZ. 597632.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.

4,078,929.—METHOD FOR TWO-COLOR DEVELOPMENT OF A XEROGRAPHIC CHARGE PATTERN. MAR. 14, 1978.
4,082,443.—SYSTEM FOR SUPERPOSITION OF COLOR SEPARATION IMAGES. APR. 4, 1978.
4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.
4,097,139.—REPRODUCING MACHINE HAVING INTERCHANGEABLE DEVELOPER HOUSINGS. JUNE 27, 1978.

Class 1F

2,637,651.—METHOD OF PRODUCING IMAGES ON RIGID SURFACES. MAY 5, 1953. CAN. 0508329.
2,885,955.—XEROGRAPHIC MACHINE. MAY 12, 1959.
2,949,848.—STENCIL MAKING. AUG. 23, 1960. CAN. 0571449.
2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINTING PLATE. SEPT. 13, 1960.
2,954,291.—METHOD FOR PREPARING A SPIRIT DUPLICATING MASTER. SEPT. 27, 1960. CAN. 0583832.
2,955,035.—RAISED XEROGRAPHIC IMAGES. OCT. 4, 1960.
2,955,052.—METHOD OF FORMING A RAISED IMAGE. OCT. 4, 1960.
2,955,531.—STENCIL MASTER FORMATION. OCT. 11, 1960.
3,109,366.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624372.
3,109,367.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624374, FRA. 1146623, GER. 1029837, GRB. 0813637.
3,143,066.—PRODUCTION OF DUPLICATING MASTERS. AUG. 4, 1964. CAN. 0722954.
3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.
3,455,240.—IMAGING SYSTEM. JULY 15, 1969. CAN. 0823599, GER. 1571913, GRB. 1165676, JAP. 0594700.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794, VZL. 0024009.
3,490,368.—PRINTING BY PARTICULATE IMAGES. JAN. 20, 1970. ARG. 0152222, ATR. 0281875, AUS. 0403243, BEL. 0674293, BRA. 0086720, CAN. 0824922, DNK. 0117303, FIN. 0047145, FRA. 1464987, GER. 1496169, GRB. 1128173, GRK. 0031516, HOL. 0145056, ITL. 0750153, JAP. 0547199, MEX. 0101075, NOR. 0130551, SAF. 0656968, SPN. 0321274, STZ. 0446906, SWD. 0355681, VZL. 0023998.
3,549,447.—IMAGING SYSTEM. DEC. 22, 1970.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,615,128.—APPARATUS FOR ELECTROSTATIC PRINTING. OCT. 26, 1971. CAN. 0910956.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,919,938.—PERMANENT ELECTROSTATIC MASTER. NOV. 18, 1975.
4,006,267.—COLOR HIGHLIGHTING PROCESS. FEB. 1, 1977.
4,068,588.—PRINTING USING AN ELECTROCHROMIC IMAGE. JAN. 17, 1978.

Class 1G 1

3,043,685.—XEROGRAPHIC AND MAGNETIC IMAGE RECORDING AND REPRODUCING. JULY 10, 1962. CAN. 0611005, FRA. 1207840, GRB. 0902481.
3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.
3,124,457.—DIFFERENTIAL IMAGE TRANSFER SYSTEM. MAR. 10, 1964. CAN. 0800184, GRB. 1031986, JAP. 0477375.
3,185,777.—MAGNETIC RECORDING. MAY 25, 1965.
3,485,621.—RECORDING BY PARTICLE ORIENTATION. DEC. 23, 1969. CAN. 0916777, GRB. 1188982, JAP. 0582501.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.
3,803,638.—RECORDING SYSTEM USING MAGNETIC CORE MATRIX. APR. 9, 1974.
3,875,576.—ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER. APR. 1, 1975.

Class 1G 2

2,756,676.—METHOD FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC PRINTS. JULY 31, 1956. CAN. 0564672.
2,868,642.—ELECTROPHOTOGRAPHIC METHOD. JAN. 13, 1959. CAN. 0569364, FRA. 1146633, GER. 1050189, GRB. 0812419.
2,919,179.—RESIST FORMING METHOD. DEC. 29, 1959. CAN. 0616771.
3,592,642.—DUPL METH PAPR SHT HTS MELTG PT TONR IMG SIMUL CAUSE TRANSF TNR FRPHOTOCNDCR AND FSG TNR IMG ON PAP. JULY 13, 1971. BEL. 0706852, FRA. 1547828, GRB. 1198306, HUN. 0157321, ITL. 0815498.

Class 1G 3

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,438,772.—IMG RPDCTN INVLVNG ELCTROSTC TRSF OF RELESBL DONR FILM FRM PTOCNDTV INSLTNG LAYER TO ADHSV TRS. APR. 15, 1969. CAN. 0838044, GRB. 1124954, JAP. 0542587.
3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

Class 1G 4

2,968,552.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. AUS. 0222058, CAN. 0624328, FRA. 1197798, GER. 1197326, GRB. 0876577.
3,166,418.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0747566, FRA. 1259438, GER. 1190334, GRB. 0952609, JAP. 0418117.
3,619,054.—OIL FILM IMAGING APPARATUS. NOV. 9, 1971.

Class 1G 5

3,234,019.—METHOD FOR FORMATION OF AN ELECTROSTATIC IMAGE RESISTANT TO DETERIORATION ON STORAGE. FEB. 8, 1966. ATR. 0248873, AUS. 0266424, BEL. 0618720, FRA. 1325903, GER. 1295374, GRB. 1006231, IND. 0081730, ISR. 0017057, ITL. 0667262, SAF. 0001489, STZ. 0407176, SWD. 0307733.

Class 1G 6

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,924,945.—APPARATUS FOR INDUCTIVE IMAGING WITH SIMULTANEOUS POLAR INK DEVELOPMENT. DEC. 9, 1975.
3,974,554.—QUANDRANGULAR TRIPETICORD GRAVURE ROLL. AUG. 17, 1976.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,020,788.—DOCTORING MEANS. MAY 3, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 1H 1

3,100,427.—PROJECTION DEVICE. AUG. 13, 1963.
3,166,419.—IMAGE PROJECTION. JAN. 19, 1965. CAN. 0699802, FRA. 1260843, GRB. 0955994.
3,166,420.—SIMULTANEOUS IMAGE FORMATION. JAN. 19, 1965. CAN. 0756267, GRB. 0955142.
3,185,050.—XEROGRAPHIC IMAGE PROCESSOR PROJECTOR. MAY 25, 1965.
3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,220,012.—SIMULTANEOUS RECORDING AND DISPLAY SYSTEM. NOV. 23, 1965. CAN. 0809339, FRA. 1373673, GER. 1303156, GRB. 1019900, ITL. 0695895, JAP. 0470425.
3,317,317.—XEROGRAPHIC METHOD OF MAKING A PARTICLE TRANSPARENCY PROJECTIBLE IMAGE. MAY 2, 1967.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.
3,593,832.—KEYBOARD INPUT DISPLAY DEVICE. JULY 20, 1971.
3,619,049.—XEROGRAPHIC IMAGERY USING A LONG PERSISTENCE PHOSPHOR INTERMEDIATE. NOV. 9, 1971.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1H 2

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,512,038.—PIN SYSTEM. MAY 12, 1970. CAN. 0873507, GRB. 1201497, JAP. 0623001.

Class 1I

3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.
3,041,167.—XEROGRAPHIC PROCESS. JUNE 26, 1962.
3,414,409.—PARTICLE TRANSFER. DEC. 3, 1968. BEL. 0713399, CAN. 0822324, FRA. 1568374, GRB. 1145026, ITL. 0829803.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,784,301.—ELECTROPHOTOGRAPHIC METHOD. JAN. 8, 1974.
3,883,349.—ELECTROPHOTOGRAPHIC CHARGING METHOD. MAY 13, 1975.
3,973,846.—ELECTROSTATIC MASTER MAKING APPARATUS. AUG. 10, 1976.
4,021,112.—PHOTORECEPTOR DARK CURRENT LEAKAGE DETECTING APP FOP XEROGRAPHIC MACHINES. May 3, 1977.
4,039,831.—TWO COLOR XERORADIOGRAPHY DEVELOPMENT. AUG. 2, 1977.

Class 1J

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,588,699.—ELECTROPHOTOGRAPHIC APPARATUS. MAR. 11, 1952.
2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,652,156.—LINEAR-TO-DRUM OPTICAL SCAN CONVERTER SYSTEM. MAR. 28, 1972.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWC. 7216975.
3,954,463.—METHOD FOR ELECTROSTATIC PRINTING. MAY 4, 1976.
4,046,472.—ELECTROSTATIC IMAGING APPARATUS. SEPT. 6, 1977.

Class 1J 1

2,297,691.—ELECTROPHOTOGRAPHY. OCT. 6, 1942.
2,357,809.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 12, 1944.
3,013,346.—XEROGRAPHIC APPARATUS. DEC. 19, 1961.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,062,109.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 6, 1962. ARG. 0149705, CAN. 0683779, CHL. 0024545, CLB. 0014851, COS. 0001435, FRA. 1291840, GER. 1290817, GRB. 0995414, GUA. 0001694, HGK. 0022168, ITL. 0646249, JAP. 0444672, KEN. 0167268, PNM. 0002135, PRU. 0008376, URG. 0007955, VZL. 0017266.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,099,943.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 6, 1963. ADN. 0000468, ARG. 0169828, ATR. 0251420, AUS. 0270773, BEL. 0629050, BRA. 0082981, BRS. 00J3736, BRU. 0000369, CAN. 0738132, CHL. 0023724, CLB. 0015207, COS. 0001436, ECD. 0000022, FIJ. 0000340, FRA. 1346575, GHA. 0000997, GIB. 1032951, GIE. 0006569, GRB. 1032951, GRK. 0025939, GUA. 0001740, GUR. 1032951, HGK. 0008969, IND. 0086614, ISR. 0018757, ITL. 0752146, JAP. 0491155, JER. 0000P97, KEN. 0001743, LXB. 0043231, MAU. 1897571, MEX. 0074814, MLS. 0014969, NIG. 0001617, NOR. 0124476, NZL. 0134238, PRU. 0008375, PTG. 0040583, SAF. 0063737, SBH. 0005169, SGP. 0008069, SHL. 0000016, SLN. 1677286, SPN. 0286059, SRK. 0000387, STZ. 0425469, SWD. 0323285, UGD. 0000169, URG. 0007713, VZL. 0017049.
3,131,617.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 5, 1964.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,146,688.—XEROGRAPHIC MACHINE. SEPT. 1, 1964. ATR. 0249503, AUS. 0272158, BEL. 0616948, CAN. 0712269, FRA. 1324504, GER. 1295372, GRB. 1009867, JAP. 0464921.
3,182,573.—MASKED PLATE XEROGRAPHY. MAY 11, 1965. CAN. 0859657, FRA. 1353685, GRB. 1021882, ITL. 0694073, JAP. 0470242.
3,205,484.—ELECTROSTATIC MEMORY SYSTEM. SEPT. 7, 1965.
3,355,983.—CARD HANDLING MECHANISM. DEC. 5, 1967. CAN. 0814086, MEX. 0113373.
3,514,201.—RECORDING APPARATUS. MAY 26, 1970. CAN. 0880484.
3,520,602.—GRAPHIC DISPLAY DEVICE. JULY 14, 1970. CAN. 0838312.
3,536,395.—TRANSACTION RECORDING APPARATUS AND SYSTEM. OCT. 27, 1970. CAN. 0870184, GRB. 1213825.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,770,430.—PHOTOELECTROSCLOGRAPHIC IMAGING PROCESS. NOV. 6, 1973.
3,865,482.—ELECTROSTATOGRAPHIC COPYING MACHINE. FEB. 11, 1975.
3,917,396.—CONTROL SYSTEM. NOV. 4, 1975.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.
3,976,374.—ELIMINATION OF REDUNDANT IMAGE. AUG. 24, 1976. GRB. 1419725.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.
RE29,514.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. JAN. 10, 1978.
4,046,472.—ELECTROSTATIC IMAGING APPARATUS. SEPT. 6, 1977.
4,054,380.—CONTROL SYSTEM FOR HIGH SPEED COPIER/DUPLICATORS. OCT. 18, 1977. GRB. 1491911.
4,093,367.—IMAGING APPARATUS. JUNE 6, 1978.

Class 1J 2

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.

2,892,391.—ELECTROPHOTOGRAPHIC CAMERA APPARATUS. JUNE 30, 1959.
3,057,275.—IMAGE KEEPING. OCT. 9, 1962.
3,185,051.—XEROGRAPHIC METHOD. MAY 25, 1965. CAN. 0740113, FRA. 1385444, GRB. 1026557, ITL. 0712017.
3,237,197.—IMAGE METHOD FOR ELECTROSTATIC RETENTION IN PHOTOCONDUCTIVE LAYERS. FEB. 22, 1966.

Class 1J 3

2,878,120.—INTERMITTENT ELECTROPHOTOGRAPHIC RECORDER—HORIZONS. MAR. 17, 1959. CAN. 0614984.
3,105,426.—XEROGRAPHIC APPARATUS. OCT. 1, 1963. CAN. 0689214, FRA. 1290414, GER. 1297476, GRB. 0989487, JAP. 0626117.
3,132,206.—HIGH SPEED PRINTING APPARATUS. MAY 5, 1964. GRB. 0999043.
3,649,114.—MULTIPLE OUTPUT ELECTROSTATIC RECORDING SYSTEM. MAR. 14, 1972. ARG. 0200567, AUS. 0447901, CAN. 0923542, NZL. 0160104.

Class 1J 4

3,148,601.—XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 15, 1964.
3,187,651.—XEROGRAPHIC REPRODUCING APPARATUS. JUNE 8, 1965. FRA. 1338861, GER. 1797533, GRB. 1015633, HGK. 0013368, JAP. 0441423, KEN. 0167368.
3,196,767.—DOCUMENT COPY MECHANISM. JULY 27, 1965. CAN. 0731929, GRB. 1032953, JAP. 0651995.
3,399,610.—XEROGRAPHIC APPARATUS. SEPT. 3, 1968. CAN. 0819923.
3,788,203.—JUSTIFICATION APPARATUS. JAN. 29, 1974. CAN. 0989929, GRB. 1380831.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,053,221.—MULTI-MODE REPRODUCING APPARATUS. OCT. 11, 1977.

Class 1J 5

2,600,580.—ELECTROPHOTOGRAPHIC APPARATUS. JUNE 17, 1952.
2,647,464.—ELECTROGRAPHY. AUG. 4, 1953.
2,791,949.—XEROGRAPHIC COPYING DEVICE. MAY 14, 1957. CAN. 0577962.
2,878,732.—XEROGRAPHIC COPIER. MAR. 24, 1959. CAN. 0596022.
3,009,402.—XEROGRAPHIC PROCESSING APPARATUS. NOV. 21, 1961.
3,040,621.—XEROGRAPHIC PLATE SUPPORTING APPARATUS. JUNE 26, 1962.
3,083,869.—XEROGRAPHIC PLATE MAGAZINE AND FEEDING APPARATUS. APR. 2, 1963.
3,091,160.—XEROGRAPHIC PLATE FEEDING AND SUPPORTING APPARATUS. MAY 28, 1963.
3,160,057.—XEROGRAPHIC PROCESSING APPARATUS. DEC. 8, 1964.
3,272,101.—XEROGRAPHIC APPARATUS. SEPT. 13, 1966.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 1J 6

RE.27,776.—ROLLER ASSEMBLY FR BELT-TYPE PHOTORECEPTR IN ELECTROSTATC PRNTNG MACHINES—RE OF D1480—3,536. OCT. 9, 1973.
2,624,652.—GRAPHIC RECORDING. JAN. 6, 1953.
3,190,199.—XEROGRAPHIC COPYING APPARATUS. JUNE 22, 1965. CAN. 0709970, GRB. 1033834, JAP. 0477813.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,536,323.—BELT ASSEMBLY—REISSUED D3492—27,776. OCT. 27, 1970. ARG. 0181307, AUS. 0437364, BEL. 0733405, BRA. 6909127, CAN. 0943179, FRA. 6917082, GRB. 1275135, HUN. 0157763, ITL. 0869475, JAP. 0700616, MEX. 0112302, PNM. 0001817, SPN. 0367615, STZ. 0506819, TIW. 0UM5646, USR. 0406385, VZL. 0025831.
3,661,452.—XEROGRAPHIC REPRODUCTION MACHINE. MAY 9, 1972. ARG. 0169621, AUS. 0442749, BEL. 0733407, CAN. 0910959, CHL. 0024800, DNK. 0125257, FRA. 6917084, GRB. 1264406, ITL. 0877771, MEX. 0115542, PNM. 0001759, PRU. 0010640, SPN. 0367613, STZ. 0491418, TIW. 0006498, USR. 0358875, VZL. 0026279.
3,664,204.—BELT ASSEMBLY FOR USE IN AN ELECTROSTATIC PRINTING MACHINE. MAY 23, 1972. ARG. 0193980, BEL. 0777322, CAN. 0939735, FRA. 7147893, GRB. 1372389, ITL. 0944437, MEX. 0128274, VZL. 0032791.
3,730,623.—VACUUM HOLDDOWN DEVICE FOR MOVING BELTS. MAY 1, 1973. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,790,271.—PROCESSING CONTROL SYSTEM FOR PRINTING MACHINES. FEB. 5, 1974. CAN. 0986173, SPN. 0418256.
3,801,092.—VACUUM HOLD-DOWN DEVICE FOR MOVING BELTS. APR. 2, 1974. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,860,340.—OPTICAL ALIGNMENT ON VACUUM PLENUM. JAN. 14, 1975. BEL. 0784630, FRA. 7220686, GRB. 1379674, ITL. 0956164.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,961,849.—ELECTROSTATIC PRINTING MACHINE. JUNE 8, 1976. ARG. 0200108, ATR. 0323556, AUS. 0458405, BEL. 0776599, CAN. 0948274, FRA. 7145342, GRB. 1374799, ITL. 0943875, MEX. 0127493, PNM. 0718307, SAF. 0718307, SPN. 0397851, STZ. 0554009, SWD. 7115731, VZL. 0032936.
4,094,606.—XEROGRAPHIC SYSTEM EMPLOYING WAVEGUIDE ADDRESSING AND MODULATING APPARATUS. JUNE 13, 1978.

Class 1J 7

3,099,944.—XEROGRAPHIC CONTROL APPARATUS. AUG. 6, 1963. CAN. 0738131, IND. 0096308, JAP. 0491992.
3,512,885.—ACCOUNTING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. MAY 19, 1970. ARG 0152214, ATR. 0285324, AUS. 0409894, BEL. 0670170, BRA. 0086686, CAN. 0763624, CHL. 0022095, CLB. 0015661, COS. 0001881, DNK. 0125559, ECD. 0000019, EGR. 0050203, EIR. 0029756, ELS. 0000939, FRA. 1459931, GER. 1522804, GRB. 1122622, GRK. 0030861, GUA. 0001741, HOL. 0146300, IND. 0096570, ISR. 0024363, ITL. 0729658, JAP. 0513607, LXB. 0049537, MEX. 0079047, NOR. 0124392, NZL. 0142991, PAK. 0116058, PLP. 0005074, PNM. 0002079, PRU. 0008106, PTG. 0044651, SAF. 0655276, SPN. 0318011, STZ. 0438031, SWD. 0358037, TRK. 0013473, UAR. 0007497, URG. 0006622, VZL. 0023997.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590. ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.

Class 1J 8

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,348,521.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799398.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.

3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,816,756.—AUTOMATIC BIAS CONTROL. JUNE 11, 1974.
3,851,966.—REPRODUCTION APPARATUS. DEC. 3, 1974. BEL. 808482.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11,, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.

Class 1K

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,638,110.—DEVC FOR MEASRNG CHRG ON MATRIAL BY CONVRTNG INTO ELCTRCL SGNLS FRICTNL FORCS CAUSD BY CHARGE. JAN. 25, 1972. AUS. 0161306, BEL. 0746479, FRA. 7007991, GRB. 1280803, HUN. 0161306, ITL. 0892329, JAP. 0681943, PLD. 0069581, SPN. 0376910, STZ. 0519185, SWD. 0364418, USR. 0412696.
3,661,453.—ELECTROSTATIC LABEL PRINTER. MAY 9, 1972. CAN. 0927471, FRA. 7122950, GRB. 1345800, ITL. 0927543.
3,893,175.—RECORDER FOR MONITORING COPIERS. JULY 1, 1975. GRB. 1427292.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,016,310.—COATR HRDWR & METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,023,901.—REPRODUCTION MACHINE SERVICE CONTROL. MAY 17, 1977.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,026,397.—CONTROL KNOB CLUTCHES WITH LOCK. MAY 31, 1977.

Class 1K 1

3,013,203.—XEROGRAPHIC ELECTROMETER APPARATUS. DEC. 12, 1961.
3,835,380.—ELECTROMETER SYSTEM. SEPT. 10, 1974.
3,852,668.—ELECTROMETER SYSTEM. DEC. 3, 1974.
3,887,845.—COPIER PHOTORECEPTOR CHARGE CONTROL. JUNE 3, 1975. GRB. 1465969.
3,891,316.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 24, 1975.
3,898,001.—ELCTROMETR SYSTM FOR NON-CNTCT DETCTN OF ELCTRSTATC CHRGE ON A MVNG ELCTRSTGRPHC IMAGNG SURFACE. AUG. 5, 1975.
3,909,126.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 30, 1975.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,935,531.—ELECTROMETER WITH LOW VOLTAGE INDICATOR. JAN. 27, 1976.
3,935,532.—AUTOMATIC ZEROING ELECTROMETER. JAN. 27, 1976.
3,998,538.—ELECTROMETER APPARATUS FOR REPRODUCTION MACHINES. DEC. 21, 1976.
4,000,944.—PHOTORECEPTOR FOR ELECTROSTATIC REPRODUCTION MACHINES WITH BUILT IN ELECTRODE. JAN. 4, 1977.
4,003,650.—CONTROLLER FOR REPRODUCTION APPARATUS. JAN. 18, 1977.
4,100,484.—D.C. ELECTROMETER. JULY 11, 1978.

Class 1K 2

2,588,675.—ELECTROCOPY APPARATUS. MAR. 11, 1952. CAN. 0489580, FRA. 1017568, GRB. 0695450.
2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,335,003.—REFLEX XEROGRAPHIC PROCESS. AUG. 8, 1967. CAN. 0764912, FRA. 1415836, GER. 1261398, GRB. 1059657, ITL. 0741353, JAP. 0511404.
3,337,339.—SCREEN XEROGRAPHY. AUG. 22, 1967. AUS. 0291558, BEL. 0638029, CAN. 0729824, DNK. 0114045, FRA. 1404424, GER. 0114045, GRB. 1027354, HOL. 0130250, ITL. 0706191, JAP. 0489562, LXB. 0044538, NOR. 0109228, SWD. 0321859.
3,676,118.—REFLEX XEROGRAPHY IMAGING SYSTEM. JULY 11, 1972.
4,063,154.—D.C. ELECTROMETER. DEC. 13, 1977.
4,063,155.—D.C. ELECTROMETER PROBE. DEC. 13, 1977.

Class 1K 3

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 2

4,043,549.—IMPACT FEEDER. AUG. 23, 1977.
4,059,353.—PHOTORECEPTOR BELT SYSTEM. NOV. 22, 1977.

Class 2A

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.
2,863,767.—XEROGRAPHIC METHOD. DEC. 9, 1958. CAN. 0580777, FRA. 1147979, GER. 1029673, GRB. 0804695.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLF AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,060,105.—TONER LOADING APPARATUS WITH REPLENISHING SUPPLY CONTAINER. NOV. 29, 1977.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,072,522.—METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE. FEB. 7, 1978.
4,078,924.—IMAGING SURFACE SMOOTHING WITH ROUGHENED FOIL NICKEL. MAR. 14, 1978.

Class 2A 1

3,764,315.—AMBIPOLAR ELECTROPHOTOGRAPHIC PLATE. OCT. 9, 1973. BEL. 0802608, GRB. 1421948.
3,948,656.—IMPROVED METHOD FOR THE PREPARATION OF CDSSE. APR. 6, 1976.

Class 2A 1A

2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.
2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.
2,753,278.—METHOD FOR THE PRODUCTION OF A XEROGRAPHIC PLATE. JULY 3, 1956. CAN. 0543309.
2,862,817.—CRYSTALLINE SELENIUM PLATE. DEC. 2, 1958.
2,919,119.—XEROGRAPHIC PLATE CONDITIONING APPARATUS. DEC. 29, 1959. CAN. 0616780.
2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.

3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.
3,077,386.—PROCESS FOR TREATING SELENIUM. FEB. 12, 1963. CAN. 0705359.
3,170,790.—RED SENSITIVE XEROGRAPHIC PLATE AND PROCESS THEREFOR. FEB. 23, 1965.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,234,020.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. FEB. 8, 1966.
3,460,296.—METAL WORKING. AUG. 12, 1969. BEL. 0705574, CAN. 0853918, GRB. 1196684.
3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237.
3,517,995.—METHOD & APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,552,848.—XEROGRAPHIC PLATE. JAN. 5, 1971.
3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.
3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.
3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.
4,007,255.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 8, 1977.
4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.
4,019,014.—METHOD FOR HEAT WELDING SELENIUM. APR. 19, 1977.

Class 2A 1B

2,822,300.—PHOTOCONDUCTIVE MATERIAL HORIZONS. FEB. 4, 1958. CAN. 0665880.
3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,467,548.—METHOD OF MAKING XEROGRAPHIC PLATE BY VACUUM EVAPORATION OF SELENIUM ALLOY. SEPT. 16, 1969.
3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.
3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.
3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.
3,615,413.—INDIUM DOPING OF A SE-AS PHOTOCONDUCTIVE ALLOYS. OCT. 26, 1971. CAN. 0917981, GRB. 1309312, JAP. 0739528.
3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.
3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.
3,685,989.—AMBIPOLAR PHOTORECEPTOR AND METHOD OF IMAGING. AUG. 22, 1972. CAN. 0971800, GRB. 1360078.
3,697,265.—VTRS SELNUM ALLY MTRX CNTNING ISLTD PRTCLS/PRTCL NETWKS OF RSN. OCT. 10, 1972. ARG. 0183560, ATR. 0299699, AUS. 0449439, BEL. 0752439, CAN. 0933014, EGR. 0090944, FRA. 7023472, GRB. 1319341, ITL. 0894623, MEX. 0116409, PNM. 0002539, SPN. 0409740, STZ. 0000000, SWD. 7216008, TIW. 0006838, USR. 0374867, VZL. 0031909.
3,879,199.—SURFACE TREATMENT OF ARSENIC-SELENIUM PHOTOCONDUCTORS. APR. 22, 1975.
3,884,688.—PHOTOSENSITIVE ELEMENT EMPLOYING A VITREOUS BISMUTH-SELENIUM FILM. MAY 20, 1975.
3,887,368.—COMPOSITION. JUNE 3, 1975.
3,898,083.—HIGH SENSITIVITY VISIBLE INFRARED PHOTOCONDUCTOR. AUG. 5, 1975.
3,909,458.—PHOTOSENSITIVE VITREOUS LAYER COMPRISING BISMUTH AND SELENIUM. SEPT. 30, 1975.
4,015,029.—SELENIUM & SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

Class 2A 1C

2,844,493.—HIGH RESISTANCE PHOTOCONDUCTOR HORIZONS. JULY 22, 1958.
2,844,543.—TRANSPARENT PHOTOCONDUCTIVE COMPOSITION - HORIZONS. MAR. 18, 1955.
2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.
2,901,349.—XEROGRAPHIC PLATE - SELENIUM PLATE WITH ARSENIC TRISULFIDE INTERFACE. AUG. 25, 1959.
3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY. 7, 1964. FRA. 1260498, GRB. 0960871.
3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.
3,682,631.—METHOD OF FORMING AN ELECTROPHOTOGRAPHIC LAYER CONTAINING A BENZOQUANAMINE RESIN BINDER. AUG. 8, 1972.
3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.
3,971,742.—ORGANO-CHALCOGEN COMPOSITIONS. JULY 27, 1976.

Class 2A 1D

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.
3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.
3,627,573.—COMPOSITION AND METHOD. DEC. 14, 1971. ARG. 0176480, AUS. 0441224, BEL. 0721965. CAN. 0892493, FRA. 0095985, GRB. 1251630, ITL. 0889828, MEX. 0124897, SPN. 0358960, STZ. 0517359, VZL. 0030358.

Class 2A 1E

2,277,013.—ELECTRIC RECORDING AND TRANSMISSION OF PICTURES. MAR. 17, 1942.
2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.
2,803,541.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0563401, FRA. 1105562, GER. 0941767, GRB. 0755683.
2,962,376.—XEROGRAPHIC MEMBER. NOV. 29, 1960.
3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.
3,879,200.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING BIX-BENZIMIDAZOLE PIGMENTS. APR. 22, 1975. ARG. 0188392, AUS. 0465970, BEL. 0763545, BRA. 0088118, CAN. 0928125, CHL. 0027130, EGR. 0093279, FRA. 7107565, GRB. 1337222, ITL. 0919105, MEX. 0122169, PNM. 0002460, SAF. 0711225, SPN. 0388590, TIW. 0008178, USR. 0449515.
3,909,261.—XEROGRAPHIC IMAGING MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. SEPT. 30, 1975. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

Class 2A 1E 1

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.
3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

Class 2A 1E 2

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

Class 2A 1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. GRB. 1106562.

3,498,835.—METHOD FOR MAKING XEROGRAPHIC PLATES. MAR. 3, 1970. ARG. 0154134, AUS. 0418468, BEL. 0700454, CAN. 0872174, FRA. 1529285, GRB. 1189504, ITL. 0807717, JAP. 0567234, MEX. 0096199, SPN. 0342303, STZ. 0479093, SWD. 0332346, VZL. 0024014.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

Class 2A 1G

3,288,603.—METHOD OF RESTORING XEROGRAPHIC PROPERTIES TO A GLASS BINDER PLATE. NOV. 29, 1966. CAN. 0800955, FRA. 1432127, GER. 1497201, GRB. 1088473, ITL. 0802168, JAP. 0519677.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,451,846.—PROCESS OF MAKING XEROGRAPHIC PLATE. JUNE 24, 1969. CAN. 0818384, GRB. 1183961, JAP. 0598621.

3,510,298.—PROCESS OF ACTIVATING PHOTOCONDUCTIVE MATERIAL IN GLASS BINDER. MAY 5, 1970. CAN. 0834668, GER. 1572366, GRB. 1189822, JAP. 0552968.

3,537,848.—PROCESS OF TREATING A XEROGRAPHIC GLASS BINDER PLATE AND PRODUCT. NOV. 3, 1970. ARG. 0180580.

3,655,376.—ELECTROPHOTOGRAPHIC DENITRIFIED GLASS BINDER PLATE. APR. 11, 1972.

3,885,962.—PHOTOGRAPHIC AND ELECTROPHOTOGRAPHIC MEMBERS WITH GLASS FIBER CONTAINING PAPER SUBSTRATES. MAY 27, 1975.

Class 2A 2

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,870,516.—METHOD OF IMAGING PHOTOCONDUCTOR IN CHARGE TRANSPORT BINDER. MAR. 11, 1975. AUS. 0466028, BEL. 0763541, CAN. 0931413, CHL. 0026797, EGR. 0094762, FRA. 7107559, GRB. 1343671, ITL. 0919108, MEX. 0122098, NZL. 0162883, PNM. 0002450, SAF. 0711219, SPN. 0388584, STZ. 0567744.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,702.—PHTOELCTRC & ELCTRPHTGRPHC PGMNTS COMPRISING DERIVATIVES OF CONDENSED PLYCYLC ARMATC HYDRCABN A. OCT. 28, 1975.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALTZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,926,629.—ELECTROPHOTOGRAPHIC METHOD AND PLATE EMPLOYING A PHTHALOCYANINE POLYMER. DEC. 16, 1975.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

4,043,812.—A PROCESS FOR PREPARATION OF 2-ANTHRYL & SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND POLY. AUG. 23, 1977. BEL. 822305, FRA. 7527053, STZ. 32598.

4,089,684.—IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES. MAY 16, 1978.

Class 2A 2A

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155547, JAP. 0650631, MEX. 0104632.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,553,009.—PROCESS OF PREPARING AN ELECTROPHOTOGRAPHIC MATERIAL. JAN. 5, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,689.—POLYCYCLIC AROMATIC POLYMER AS A PHOTO-CONDUCTOR OR OVERLAYER. MAY 20, 1975.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,899,329.—MIXTURE OF PHOTOCONDUCTORS IN AN ACTIVE MATRIX. AUG. 12, 1975. ARG. 0187047, ATR. 327000, AUS. 0450862, BEL. 0775968, CAN. 0971797, CHL. 0027272, FRA. 7143179, GRB. 1348138, GUA. 0002724, ITL. 0941822, MEX. 1328040, PNM. 0002602, SAF. 0718022, SPN. 397403, STZ. 0026771.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

3,941,085.—RELEASE MATERIAL APPLICATOR. MAR. 2, 1976.

3,941,750.—POLYVINYL PYREMAL-AN INTRINSIC PHOTOCONDUCTOR AND ACTIVE MATRIX POLYMER. MAR. 2, 1976.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE & PROESS. FEB. 1, 1977.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

4,046,563.—PHOTOCONDUCTIVE COMPOSITION CONTAINING A TRICYANOPYREME, ARTICLE AND PROCESS OF USE. SEPT. 6, 1977. FRA. 7509147.

4,050,934.—ELECTRON ACCEPTOR MONOMERS & POLYMERS. SEPT. 27, 1977.

4,056,391.—METHOD FOR ENHANCING SOLID SOLUTION STABILITY OF ELECTRON ACCEPTOR MOLECULES AND ELECTROPHO. NOV. 1, 1977.

4,072,519.—PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT. FEB. 7, 1978. FRA. 7509146.

4,076,528.—XEROGRAPHIC BINDER PLATE. FEB. 28, 1978. AUS. 456887, BEL. 775967, CAN. 971796, CHL. 27271, FRA. 7143178, GRB. 1358269, ITL. 941821, MEX. 124712, PNM. 2599, SAF. 718023, SPN. 397402, STZ. 26772.

4,092,161.—INORGANIC PHOTOCONDUCTORS WITH PHENYL SUBSTITUTED IMAGE TRANSPORT MATERIALS. MAY 30, 1978. AUS. 462805, BEL. 790689, CAN. 1007922, FRA. 7411475, GRB. 1462986, ITL. 969902, MEX. 133728, SPN. 407984, STZ. 28515, VZL. 33956.

4,098,795.—METHOD FOR THE PREPARATION OF X-FORM METAL FREE PHTHALOCYAMINE. JULY 4, 1978. ARG. 182328, BEL. 737989, CAN. 899870, FRA. 6928871, GER. 1943381, GRB. 1280843, ITL. 870314, JAP. 654041, MEX. 116011.

Class 2A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

4,069,046.—POLYMERIZED VINYL CARBAZOLES SENSITIZED BY NITRO-SUGSTITUTED 9-DICYANOMETHYLENE FLUORENES. JAN. 17, 1978.

Class 2A 2C

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

Class 2A 2E

4,099,969.—COATING METHOD TO IMPROVE ADHESION OF PHOTOCONDUCTORS. JULY 11, 1978.

Class 2B

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.

3,617,265.—METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE. NOV. 2, 1971.

3,635,705.—MULTI-LAYERED HALOGEN-DOPED SELENIUM PHOTOCONDUCTIVE ELEMENT. JAN. 18, 1972. GRB. 1311329, ITL. 0901916, JAP. 0739531.

3,639,120.—2-LAYERED PHOTOCONDUCTIVE ELEMNT CONTNG A HALOGEN DOPED STORG LAYER AND SELENIUM ALLOY CNTRL LAYER. FEB. 1, 1972. CAN. 0870535, GRB. 1193876, JAP. 0558440.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,712,810.—AMBIPOLAR PHOTORECEPTOR AND METHOD. JAN. 23, 1973. CAN. 0971025, GRB. 1363266.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,928,034.—ELECTRON TRANSPORT LAYER OVER AN INORGANIC PHOTOCONDUCTIVE LAYER. DEC. 23, 1975. AUS. 0453265, BEL. 0763542, CAN. 0932199, CHL. 0026802, EGR. 0093924, FRA. 7107560, GRB. 1337227, GUA. 0002423, ITL. 0919109, MEX. 0121682, NZL. 0162884, PNM. 0002473, SAF. 0711220, SPN. 0388585, STZ. 0576659, SWD. 0363176, TIW.00 07181.

3,953,207.—A COMPOSITE LAYERED PHOTORECEPTOR. APR. 27, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,012,251.—MULTI-LAYERED PHOTOCONDUCTIVE MEMBER. MAR. 15, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATRIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,018,602.—METHOD FOR IN-SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE. APR. 19, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,047,948.—COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY. SEPT. 13, 1977.

4,047,949.—COMPOSITE LAYERED IMAGING MEMBER FOR ELECTROPHOTOGRAPHY. SEPT. 13, 1977.

4,049,449.—METHOD FOR FORMING AN ELECTROPHOTOGRAPHIC MEMBER. SEPT. 20, 1977.

4,050,935.—TRIGONAL SE LAYER OVERCOATED BY BIS(4-DIETHYLAMINO-2-METHYLPHENYL) PHENYLMETANE CONTAINING. SEPT. 27, 1977. FRA. 7709994.

4,052,205.—PHOTOCONDUCTIVE IMAGING MEMBER WITH SUBSTITUTED ANTHRACENE PLASTICIZER. OCT. 4, 1977.

4,053,311.—POLY-L-VINYL CARBAZOLE IMAGE TRANSPORT LAYER PLASTICIZED OF BIS-(4-DIETHYLAMINO-2-METHYLPHE. OCT. 11, 1977.

4,062,886.—FLUORENONE CARBOXYLE ACID ESTERS. DEC. 13, 1977. FRA. 7621895.

4,063,947.—PHOTOCONDUCTIVE INSULATING FILMS COMPRISING FLUORENONE-SUBSTITUTED OLIGOMERS. DEC. 20, 1977.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.

4,078,925.—A COMPOSITE LAYERED PHOTORECEPTOR. MAR. 14, 1978.

4,081,274.—COMPOSITE LAYERED PHOTORECEPTOR. MAR. 28, 1978.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

Class 2B 1

2,901,348.—RADIATION SENSITIVE PHOTOCONDUCTIVE MEMBER. AUG. 25, 1959. CAN. 0575600, FRA. 1099631, GER. 1032669, GRB. 0789802.

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,243,293.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. MAR. 29, 1966. CAN. 0830430.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,539,255.—XEROGRAPHIC RECORDING APPARATUS - LIGHT-CONTROLLED-CHARGE STORAGE LAYER. NOV. 10, 1970.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,619,153.—PHOTOCONDUCTIVE ELMNT AND PROCESS EMPLYNG SBSTUTD SILYLISOBUTYLETHYLENEDIAMINE ADHESIVE INTERLAYE. NOV. 9, 1971. ARG. 0180118, ATR. 0305764, AUS. 0434739, BEL. 0733402, BUL. 0017353, CAN. 0898034, DNK. 0131833, EGR. 0078900, FRA. 6917079, GRB. 1229559, GRK. 0040058, IND. 0121424, ISR. 0032250, ITL. 0864983, JAP. 0702563, LXB. 0058678, MEX. 0109385, NOR. 0125557, NZL. 0156506, PAK. 0121226, PLP. 0008481, PNM. 0001683, PTG. 0051754, RHD. 2236953, RMN. 0054256, SAF. 0693687, SPN. 0367618, STZ. 0511461, SWD. 0341926, TIW. 0006442, TRK. 0015647, USR. 0300036, VTM. 0001865.

3,713,821.—PHOTORECEPTOR INTERFACE. JAN. 30, 1973. ARG. 0194731, ATR. 0322357, AUS. 0464711, BEL. 0784453, CAN. 0964916, EGR. 0099870, FRA. 7220691, GRB. 1393612, ISR. 0039655, ITL. 0959793, SAF. 0723958, SPN. 0403454, STZ. 0554007, SWD. 0367491, VZL. 0032939.

3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,795,513.—METHOD OF STORING AN ELECTROSTATIC IMAGE IN A MULTILAYERED PHOTORECEPTOR. MAR. 5, 1974. BEL. 0788303, CAN. 970918, FRA. 7230831, GRB. 1388934, ITL. 0964410, SWD. 7211341.

3,799,775.—XEROGRAPHIC SYSTEM. MAR. 26, 1974. ARG. 0172053, ATR. 0300559, AUS. 0423123, BEL. 0720940, BRA. 6800650, BUR. 0000043, CAM. 00043/3, CAN. 0895805, CHL. 0024257, EIR. 0032903, FRA. 1586238,

GNR. 0000039, GRB. 1243384, GRK. 0039223, IND. 0119625, ISR. 0031543, ITL. 0844307, LEB. 0002816, LIB. P102693, LXB. 0056890, MEX. 0105163, MLG. 0003058, MLW. 00MW569, MNC. 8126975, MRC. 0014727, NOR. 0128132, NZL. 0153781, PAK. 0120895, PLP. 0009065, PNM. 0002053, PTG. 0050322, RHD. 5369487, SAF. 0681107, SPN. 0358355, STZ. 0506102, SWD. 0345530, TGR. 0000547, URG. 0009361, VTM. 0001830, VZL. 0023696, ZMB. 0156971.

3,816,288.—GLOW DISCHARGE TECHNIQUE FOR THE PREPARATION OF ELECTROPHOTOGRAPHIC PLATES. JUNE 11, 1974.

3,888,667.—HETROPHASE ADHESIVE COMPOSITIONS CONTAINING POLYSULFONE FOR METAL-SELENIUM COMPOSITIES. JUNE 10, 1975.

3,891,435.—HETEROPHASE ADHESIVE COMPOSITIONS CONTAINING CHLOROSULFONATED POLYETHLENE FOR METAL-SELENIUM CO. JUNE 24, 1975.

3,895,131.—ELECTROLESS COATING METHOD. JULY 15, 1975.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,958,207.—INJECTION CURRENT DEVICE AND METHOD. MAY 18, 1976.

4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2B 2

2,860,048.—XEROGRAPHIC PLATE. NOV. 11, 1958.

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME—HORIZONS. MAY 12, 1959. CAN. 0621931.

3,092,493.—PROTECTED XEROGRAPHIC PLATE. JUNE 4, 1963.

3,146,145.—PROCESS FOR ADHERING PLASTIC TO VITREOUS SELENIUM. AUG. 25, 1964.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,837,849.—MULTILAYERED VARIABLE SPEED PHOTORECEPTOR AND METHOD OF USING SAME. SEPT. 24, 1974. BEL. 0788302, CAN. 0978007, FRA. 7230830, GRB. 1401040, ITL. 0964409, SWD. 7211342.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,868,983.—HAND TOOL. MAR. 4, 1975.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,912,511.—MULTICOMPONENT ORGANIC COATING OF POLYESTER POLYURETHAND AND HUMIDITY. OCT. 14, 1975. ARG. 0182692, BEL. 0767325, CAN. 0938143, FRA. 7118948, GRB. 1350476, ITL. 0926822, MEX. 0121668.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.

4,006,019.—METHOD FOR PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,006,020.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.

4,012,255.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAR. 15, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,064,514.—PORTABLE CAMERA. DEC. 20, 1977.

4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.

4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.

4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.

4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES. JULY 11, 1978

Class 2B 3

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 08486r1, GRB. 1201376, JAP. 0595641.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

Class 2B 4

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.

4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2C

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,317,316.—INTERNAL FROST RECORDING. MAY 2, 1967. ATR. 0272830, AUS. 0292886, BEL. 0648043, CAN. 0882890, FRA. 1399017, GER. 1243018, GRB. 1069741, ITL. 0725002, JAP. 0521009, LXB. 0046101, NOR. 0122729, STZ. 0469292, SWD. 0319083.

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS

CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,443,937.—IMAGE RESOLUTION. MAY 13, 1969. CAN. 0824316, GRB. 1137766, JAP. 0544235.

3,443,938.—FROST IMAGING EMPLOYING A DEFORMABLE ELECTRODE. MAY 13, 1969. CAN. 0801263, FRA. 1441806, GRB. 1073097, JAP. 0573732.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,707,391.—IMAGING PROCESS. DEC. 26, 1972.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

3,892,567.—ELECTROSTATICALLY DEFORMABLE MATERIALS. JULY 1, 1975. ARG. 0196065, BEL. 0781973, CAN. 9814520, FRA. 7213876, GRB. 1394286, ITL. 0951328, MEX. 0124825.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,054,381.—TONER FILTER ARRANGEMENT. OCT. 18, 1977.

4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

4,093,369.—CLEANING SYSTEM. JUNE 6, 1978.

Class 2D

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLD. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

Class 2E

2,599,542.—ELECTROPHOTOGRAPHIC PLATE. JUNE 10, 1952.

2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.

2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.

2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.

3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.

3,350,203.—XEROGRAPHIC PLATE. OCT. 31, 1967. CAN. 0715017, FRA. 1421950, GER. 1270400, GRB. 1085989, ITL. 0750417, JAP. 0511420.

3,447,957.—METHOD OF MAKING A SMOOTH SURFACED ADHESIVE BINDER XEROGRAPHIC PLATE. JUNE 3, 1969. CAN. 0788947.

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.

3,536,397.—XEROGRAPHIC APPARATUS. OCT. 27, 1970. CAN. 0917231.

3,536,481.—ELECTROLYTIC PROCESS OF FORMING A XEROGRAPHIC BELT. OCT. 27, 1970. ARG. 0175659, AUS. 0416583, BEL. 0716410, CAN. 0865080, FRA. 1572605, GRB. 1200670, ITL. 0859021, MEX. 0103043, SWD. 0345698.

3,536,485.—XEROGRAPHIC PLATE SUPPORTED BY A MANDREL. OCT. 27, 1970.

3,578,445.—XEROGRAPHIC PLATE FABRICATION. MAY 11, 1971.

3,634,134.—METHOD OF MAKING A PHOTOCONDUCTIVE COMPOSITION AND DEVICE. JAN. 11, 1972. ARG. 0184074, ATR. 0307226, AUS. 449514, BEL. 0752440, CAN. 0904111, EGR. 0083703, FRA. 7023473, GRB. 1319342, ITL. 0894622, MEX. 0117839, PNM. 00025[illegible], SPN. 0381111, STZ. 0548624, SWD. 0351734, TIW. 0007153.

3,695,757.—XEROGRAPHIC PLATE. OCT. 3, 1972.

3,746,571.—METHOD OF VACUUM EVAPORATION. JULY 17, 1973.

3,752,691.—METHOD OF VACUUM EVAPORATION. AUG. 14, 1973.

3,756,811.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIALS OF DIFFERENT DYNAMIC RANGES. SEPT. 4, 1973. CAN. 0894715, GRB. 1226578.

3,787,208.—XEROGRAPHIC IMAGE MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. JAN. 22, 1974. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

3,788,889.—METHOD OF PREPARING BINDER LAYERS. JAN. 29, 1974.

3,837,906.—METHOD OF MAKING A XEROGRAPHIC BINDER LAYER AND LAYER SO PREPARED. SEPT. 24, 1974. ARG. 0186444, ATR. 0319750, AUS. 0448147, BEL. 0763392, CAN. 0939204, CHL. 0027098, FRA. 7107568, GRB. 1292425, ITL. 0918910, NZL. 0162892, PNM. 0002439, SAF. 0711228, SPN. 0388640, STZ. 0558554, SWD. 0036479, TIW. 0007713.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,894,868.—ELECTRON TRANSPORT BINDER STRUCTURE. JULY 15, 1975. AUS. 0461951, BEL. 0763543, CAN. 0932196, CHL. 0026795, EGR. 0096346, FRA. 7107561, GRB. 1337226, GUA. 0002467, ITL. 0919110, MEX. 0120807, NZL. 0162885, PNM. 0002481, SAF. 0711221, SPN. 0388586, TIW. 0007182, USR. 0444380.

3,911,091.—MILLING TRIGONAL SELENIUM PARTICLES TO IMPROVED XEROGRAPHIC PERFORMANCE. OCT. 7, 1975.

3,911,162.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. OCT. 7, 1975. BEL 0798324.

3,926,762.—R F SPUTTERING OF TRIGONAL SELENIUM FILM. DEC. 16, 1975.

3,944,682.—METHOD OF PROVIDING AN ELECTROPHOTOGRAPHIC COATING AND COMPOSITIONS FOR METHOD. MAR. 16, 1976.

3,945,723.—RESILIENT ROLLERS. MAR. 23, 1976. ARG. 0205448.

3,954,466.—ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAY 4, 1976.

3,979,495.—METHOD OF MAKING A PHOTORECPTOR. SEPT. 7, 1976.

3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,014,697.—ELECTROSTATOGRAPHIC IMAGING MEMBER. MAR. 29, 1977.

4,014,728.—METHOD OF MAKING AN IMAGING MEMBER. MAR. 29, 1977.

4,015,985.—COMPOSITE XEROGRAPHIC PHOTORECPTOR WITH INJECTING CONTACT LAYER. APRIL 5, 1977. BEL. 0840221.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

4,033,768.—METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE. JULY 5, 1977.

4,047,973.—RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HYDRAULIC LATHING. SEPT. 13, 1977.
4,071,363.—METHOD OF MAKING COMPOSITE XEROGRAPHIC PHOTORECEPTOR WITH INJECTING CONTACT LAYER FOR A PHO. JAN. 31, 1978. BEL. 840221, FRA. 7610576.
4,072,518.—METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE. FEB. 7, 1978.
4,076,183.—PHOTOCONDUCTOR INCREMENTING APPARATUS. FEB. 28, 1978.
4,076,564.—ROUGHENED IMAGING SURFACE FOR CLEANING. FEB. 28, 1978.

Class 2F

2,619,418.—XEROGRAPHIC PLATE HOLDER. NOV. 25, 1952.
3,143,044.—XEROGRAPHIC PLATE HOLDER. AUG. 4, 1964.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,820,888.—MISTRACK INTERLOCK FOR SELENIUM BELT. JUNE 28, 1974.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,874,790.—FAIL-SAF MECH STPNG MVMNT PHTCNDCTV BLT ELTRSTC REPRDCTN MACH WHEN TRCKNG BECOMES IREGULAR AND UN. APR. 1, 1975.
3,888,577.—APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY. JUNE 10, 1975. BEL. 0810900.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.
4,005,285.—OPTICAL SYSTEM FOR EXTENDING PHOTOSENSOR ARRAY RESOLUTION. JAN. 25, 1977.
4,009,388.—ARRANGEMENT FOR EXTENDING PHOTOSENSOR ARRAY SOLUTION. FEB. 22, 1977.
4,027,966.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.
4,040,157.—DRUM SUPPORT APPARATUS. AUG. 9, 1977.
4,068,942.—ADVANCED PHOTORECEPTOR. JAN. 17, 1978. BEL. 847264, FRA. 7630970.
4,088,403.—REPLENISHABLE PHOTOSENSITIVE SYSTEM. MAY 9, 1978.

Class 3

3,935,517.—CONSTANT CURRENT CHARGING DEVICE. JAN. 27, 1976.

Class 3A

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.
2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.
2,934,649.—INDUCTION CHARGING. APR. 26, 1960. CAN. 0616346.
3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,684,364.—LIFTOFF ELECTRODE. AUG. 15, 1972.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,884,181.—CAPILLARY BAFFLE-CONSTANT OIL HEIGHT INDEPENDENT TO OIL LEVEL. MAY 20, 1975.
3,893,800.—BACKSIDE HEATING AND FIXING APP IN AN ELECTRONIC PHOTOGRAPH DUPLICATOR. JULY 8, 1975.
3,957,423.—STRIPPER FINGER DESIGN. MAY 18, 1976.
4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.
4,082,444.—LAMP CARRIAGE DRIVE SYSTEM. APR. 4, 1978.

Class 3B

2,912,586.—XEROGRAPHIC CHARGING. NOV. 10, 1959.
3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,449,568.—CORONA DISCHARGE APPARATUS FOR CREATING AN ELECTROSTATIC CHARGE PATTERN ON A XEROGRAPHIC SURFAC. JUNE 10, 1969. CAN. 0858664.
3,532,494.—SOLID AREA DEVELOPMENT IN XEROGRAPHY EMPLOYING AN INSULATING SCREEN IN THE CHARGING STEP. OCT. 6, 1970.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
4,043,656.—TRANSPARENCY COPYING MACHINE. AUG. 23,1977.
4,073,587.—COROTRON APPARATUS. FEB. 14, 1978.
4,095,233.—METHOD FOR FORMING A CHARGE PATTERN. JUNE 13, 1978.

Class 3C

2,543,051.—METHOD OF CHARGING AND EXPOSING ELECTROPHOTOGRAPHIC PLATES. FEB. 27, 1951.
2,705,675.—PLATE CHARGING CIRCUIT FOR .ELECTROPHOTOGRAPHY. APR. 5, 1955.
2,741,959.—ELECTROPHOTOGRAPHY. APR. 17, 1956. CAN. 0533763.
2,836,725.—CORONA CHARGING DEVICE. MAY 27, 1958. CAN. 0571450, FRA. 1188606, GER. 1787078, GRB. 0826088.
2,868,989.—ELECTROSTATIC CHARGING METHOD AND DEVICE. JAN. 13, 1959. CAN. 0584243.
2,965,756.—ELECTROSTATIC CHARGING APPARATUS. DEC. 20, 1960.
3,017,509.—XEROGRAPHIC PLATE FEEDING AND CHARGING APPARATUS. JAN. 16, 1962.
3,122,634.—CONTROLLED CHARGING IN XEROGRAPHIC COPYING APPARATUS. FEB. 25, 1964. CAN. 0706543, FRA. 1352624, GER. 1210323, GRB. 1026262, JAP. 0446815.
3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,335,274.—XIC CHARGING APPARATUS WITH MEANS TO AUTOMATICALLY CONTROL THE POT ENTAIL APPLIED TO THE CORONA. AUG. 8, 1967. CAN. 0801834, FRA. 1459487, GRB. 1121498, ITL. 0734870, MEX. 0085777.
3,382,360.—XIC CHARGING SYSTEM HAVING MEANS FOR PROVIDING AN AIR CUSHION BETWEEN CHARGING DEVICE AND XIC DR. MAY 7, 1968.
3,457,405.—CORONA WIRE MOUNTING MEANS WHICH COMPENSATES FOR WIRE EXPANSION DUE TO HEAT. JULY 22, 1969. CAN. 0857406, GRB. 1196927.
3,471,695.—CORONA CHGNG APPTS W/MEANS TO URGE A FLOW OF AERIFORM FLUID ACROSS THE CORONA WIRES. OCT. 7, 1969. CAN. 0856355, GRB. 1220745.
3,483,372.—CORONA CHARGING DEVICE WITH CONDUCTIVE SHIELD AND INSULATING MEANS ON SAID SHIELD. DEC. 9, 1969. CAN. 0840508, GRB. 1169632, JAP. 0770817.
3,517,995.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,566,108.—CORONA GENERATING ELECTRODE STRUCTURE FOR USE IN A XEROGRAPHIC CHARGING METHOD. FEB. 23, 1971.
3,598,991.—ELCTRSTC CHRGNG DEV HAVNG SPRK GAP VOLTG REGULTR BETWEEN A CORONA SOURCE AND VOLTG SOURCE. AUG. 10, 1971. AUS. 0457211, BEL. 0754426, CAN. 0916233, CZC. 0163219, EGR. 0084558, FRA. 7029148, GRB. 1322378, ITL. 0901159, JAP. 0715800, PLD. 0070053, SPN. 0382404, STZ. 0513436, SWD. 0359663, TIW. 0007173, USR. 0442617.

3,604,925.—APPARATUS FOR CONTROLLING THE AMOUNT OF CHARGE APPLIED TO SURFACE. SEPT. 14, 1971.
3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED W/MIXTURE OF HYDROSCOPIC MATERIAL AND HYDROPHILIC B. OCT. 21, 1971.
3,675,011.—METHODS AND APPARATUS FOR OPERATING RAISED COROTRONS OF OPPOSITE POLARITY. JULY 4, 1972.
3,723,793.—COATED CORONA GENERATING ELECTRODE. MAR. 27, 1973.
3,742,237.—AC CORONA CHARGING APPARATUS. JUNE 26, 1973. CAN. 0955299, GRB. 1387209.
3,760,229.—A C COROTRON. SEPT. 18, 1973. GRB. 1410671.
3,769,506.—CORONA GENERATING METHOD AND APPARATUS THEREFOR. OCT. 30, 1973.
3,790,999.—CORONA WIRE APPARATUS. FEB. 12, 1974.
3,800,153.—ELECTROPHOTOGRAPHY CHARGING DEVICE. MAR. 26, 1974.
3,813,547.—CORONA GENERATING APPARATUS. MAY 28, 1974.
3,813,548.—CORONA GENERATING METHODS AND APPARATUS THEREFOR. MAY 28, 1974.
3,816,749.—EXPOSURE CONTROLLED CORONA DEVICE. JUNE 11, 1974.
3,851,229.—CURRENT MEASURING DEVICE. NOV. 26, 1974.
3,870,883.—ELECTROSTATIC PRINTING MACHINE WITH SELF-CLEANING CORONAL GENERATING DEVICE. MAR. 11, 1975.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,919,605.—CORONA DISCHARGE APPARATUS. NOV. 11, 1975.
3,922,548.—CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT. NOV. 25, 1975.
3,937,960.—CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. FEB. 10, 1976.
3,939,386.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. FEB. 17, 1976.
3,950,680.—ELECTROSTATOGRAPHIC DIAGNOSTIC SYSTEM. APR. 13, 1976.
3,976,880.—CORONA STABILIZATION ARRANGEMENT. AUG. 24, 1976.
3,976,881.—ARRANGEMENT FOR STABILIZING CORONA DEVICES. AUG. 24, 1976.
3,978,379.—CORONA GENERATING DEVICE WITH AN IMPROVED CLEANING MECHANISM. AUG. 31, 1976.
3,983,393.—CORONA DEVICE WITH REDUCED OZONE EMISSION. SEPT. 28, 1976.
3,996,466.—TRANSFER CORONA DEVICE WITH ADJUSTABLE SHIELD BIAS. DEC. 7, 1976.
4,027,960.—TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.
4,038,544.—IMPROVED APPARATUS AND METHOD FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. JULY 26, 1977.
4,038,546.—AN IMPROVED APPARATUS FOR A CORONA GENERATING DEVICE. JULY 26, 1977.
4,056,723.—ROTATIABLE CORONA DEVICE. NOV. 1, 1977.
4,068,284.—CORONA DISCHARGE DEVICE. JAN. 10, 1978. CAN. 1029794, FRA. 7432708, GRB. 1407718.
4,072,413.—ELECTROSTATOGRAPHIC REPRODUCTION METHODS AND MACHINES. FEB. 7,1978.
4,099,219.—CORONODE TENSIONING AND SUPPORT ARRANGEMENT. JULY 4, 1978.
4,100,411.—BIASING ARRANGEMENT FOR A CORONA DISCHARGE DEVICE. JULY 11, 1978. GRB. 1498716.

Class 3C 1

2,790,082.—XEROGRAPHIC CHARGING DEVICE. APR. 23, 1957.
2,879,395.—CHARGING DEVICE. MAR. 24, 1959. CAN. 0604246.
2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.
2,932,742.—XEROGRAPHIC CHARGING DEVICE AND METHOD. APR. 12, 1960. CAN. 0606202, FRA. 1150711, GER. 1099848, GRB. 0822555.
2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.
3,076,092.—XEROGRAPHIC CHARGING APPARATUS. JAN. 29, 1963.
3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.
3,873,895.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. MAR. 25, 1975.
3,886,416.—METHOD AND APPARATUS FOR ADJUSTING COROTRON CURRENTS. MAY 27, 1975.
3,908,164.—CORONA CURRENT MEASUREMENT AND CONTROL ARRANGEMENT. SEPT. 23, 1975.
3,921,042.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED CORONA GENERATING DEVICE. NOV. 18, 1975.
3,961,193.—SELF ADJUSTING CORONA DEVICE. JUNE 1, 1976.
3,984,182.—PRETRANSFER CONDITIONING FOR ELECTROSTATIC PRINTING. OCT. 5, 1976.
4,038,593.—REGULATED HIGH VOLTAGE AC POWER SUPPLY WITH REGULATED DC BIAS CURRENT. JULY 26, 1977. BEL. 0846572.
4,039,257.—PRETRANSFER COROTRON SWITCHING. AUG. 2, 1977. GRB. 1498259
4,042,874.—HIGH VOLTAGE AC POWER SUPPLY WITH AUTOMATICALLY VARIABLE DC BIAS CURRENT. AUG. 16, 1977.
4,057,723.—COMPACT CORONA CHARGING DEVICE. NOV. 8, 1977. BEL. 850335, SPN. 455179.
4,086,650.—CORONA CHARGING DEVICE. APR. 25, 1978. BEL. 844116, SAF. 764178, SPN. 449789.

Class 3C 2

2,856,533.—MOVING WIRE CORONA. OCT. 14, 1958.
3,304,476.—TRANSFER SWITCH FOR A XEROGRAPHIC APPARATUS. FEB. 14, 1967.
3,433,948.—NEGATIVE CORONA DISCHARGE SYSTEM USING ALTERNATING ELECTRIC FIELDS ACROSS THE AIR GAP. MAR. 18, 1969. CAN. 0855811, FRA. 1564157, GRB. 1211442, ITL. 0829718, JAP. 0655407.
3,541,329.—NEGATIVE CORONA DEVICE WITH MEANS FOR PRODUCING A REPELLING ELECTROSTATIC FIELD. NOV. 17, 1970. CAN. 0841136, FRA. 1546256, GRB. 1205040, JAP. 0634886.

Class 3C 3

2,774,921.—APPARATUS FOR ELECTROSTATICALLY CHARGING INSULATING IMAGE SURFACES FOR ELECTROPHOTOGRAPHY. DEC. 18, 1956.
2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.
3,146,385.—XEROGRAPHIC PLATE CHARGING METHOD AND APPARATUS. AUG. 25, 1964. GRB. 1013924.
3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972.
3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972.
3,689,767.—METHOD AND APPARATUS FOR UNIFORMLY CHARGING THE SURFACE OF AN INSULATING MEMBER. SEPT. 5, 1972.
3,709,595.—PRINTER SYSTEM. JAN. 9, 1973.

Class 3C 4

2,777,957.—CORONA DISCHARGE DEVICE. JAN. 15, 1957. AUS. 0153841, CAN. 0558592, FRA. 1041698, GER. 0924420, GRB. 0696515, PNM. 0001841, SAF. 0012801. STZ. 0296687, SWD. 0159714.
2,778,946.—CORONA DISCHARGE DEVICE AND METHOD OF XEROGRAPHIC CHARGING. JAN. 22, 1957. CAN. 0558259.
2,965,754.—DOUBLE SCREEN CORONA DEVICE. DEC. 20, 1960. CAN. 0622926.
3,062,956.—XEROGRAPHIC CHARGING APPARATUS - SCOROTRON CONTROL CIRCUIT - PHILCO PRINTER PROCESSOR. JUNE 11, 1962. CAN. 0686702.

3,068,356.—XEROGRAPHIC CHARGING APPARATUS. DEC. 11, 1962. CAN. 0681400, GER. 1214996, GRB. 0990114.

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.

3,496,351.—CORONA CONTROL CIRCUIT FOR STEPPING XEROGRAPHIC RECORDNG APPARATUS. FEB. 17, 1970. CAN. 0834978, FRA. 1512919, GRB. 1170472, ITL. 0793742, JAP. 0923309.

3,688,107.—ELECTROSTATOGRAPHIC CHARGING APPARATUS. AUG. 29, 1972. CAN. 0938660, GRB. 1365130.

3,875,407.—CORONA GENERATOR CLEANING APPARATUS. APR. 1, 1975.

3,908,127.—CORONA GENERATING DEVICES. SEPT. 23, 1975.

3,909,614.—SCOROTRON POWER SUPPLY CIRCUIT. SEPT. 30, 1975.

3,936,635.—CORONA GENERATING DEVICE. FEB. 3, 1976.

Class 3C 5

2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.

2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 3C 6

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.

3,549,962.—UNIFORM ELECTROSTATIC CHARGING. DEC. 22, 1970. CAN. 0897757, GRB. 1189578.

3,648,133.—UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE. MAR. 7, 1972.

3,743,830.—DEVICE FOR UNIFORMLY CHARGING A NON PLANAR ELECTROPHOTOGRAPHIC PLATE. JULY 3, 1973.

3,764,866.—CORONA GENERATOR. OCT. 9, 1973. ARG. 0198185, ATR. 0325420, AUS. 0467386, BEL. 0793227, CZC. 0168018, DNK. 0131699, FRA. 7245484, GRB. 1402739, ITL. 0972692, MEX. 0128581, NZL. 0169420, PTG. 0058386, SAF. 0729029, STZ. 0553435, SWD. 7216596.

3,792,913.—XEROGRAPHIC ERASE MECHANISM. FEB. 19, 1974. GRB. 1422175.

3,811,048.—ELECTROPHOTOGRAPHIC CHARGING APPARATUS. MAY 14, 1974.

3,967,119.—CORONA CHARGING DEVICE. JUNE 29, 1976.

3,967,891.—IMAGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.

Class 3C 7

3,323,373.—ESCAPEMENT MECHANISM. JUNE 6, 1967. CAN. 0841310.

3,324,291.—CORONA GENERATING DEVICE W/MEANS TO CAUSE AIR FLOW THERE-THROUGH TO MAINTN PARTS FREE OF DUST. JUNE 6, 1967. CAN. 0794904, GRB. 1070615, JAP. 0512648.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,496,352.—SELF-CLEANING CORONA GENERATING APPARATUS. FEB. 17, 1970. CAN. 0856356, GRB. 1227987, JAP. 0641478.

3,743,540.—SURFACE CLEANING BY IONIZED FLOW. JULY 3, 1973.

3,794,839.—CORONA GENERATING APPARATUS. FEB. 26, 1974. GRB. 1434863.

3,942,006.—CORONA GENERATOR CLEANING APPARATUS. MAR. 2, 1976.

3,965,400.—CORONA GENERATING DEVICE WITH IMPROVED BUILT IN CLEANING MECHANISM. JUNE 22, 1976.

4,019,055.—CORONA CLEANING ASSEMBLY. APR. 19, 1977. BEL. 0795870, GRB. 1416480.

Class 3C 8

3,335,273.—XIC CHARGING APPARATUS W/MEANS TO TERMINATE CHARGING CYCLE WHEN A PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0794905, FRA. 1462556, GRB. 1128618, ITL. 0743940, JAP. 0632530, MEX. 0087314.

3,335,275.—XIC CHARGNG APPTS W/ADJSTBL MEANS TO TERMINATE CHRGNG CYCLE WHEN PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0801833.

3,667,036.—ELECTROMETER AMPLIFIER CIRCUITS. MAY 30, 1972.

3,678,350.—ELECTRIC CHARGING METHOD. JULY 18, 1972.

3,805,069.—REGULATED CORONA GENERATOR. APR. 16, 1974.

3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.

3,944,356.—A CHARGING APPARATUS. MAR. 16, 1976.

3,980,929.—CORONA CURRENT INTERRUPTER. SEPT. 14, 1976.

Class 3C 9

2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.

3,557,367.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGING OF A PHOTOCONDUCTOR. JAN. 19, 1971. ARG. 0170822, BEL. 0720017, BRA. 6800368, CAN. 0879279, FRA. 1597512, GRB. 1244378, ITL. 0840366, JAP. 0628391, MEX. 0105427, VZL. 0023699.

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 0906045.

3,765,026.—ELECTROGRAPHIC RECORDING SYSTEM. OCT. 9, 1973. CAN. 0948272, GRB. 1365346.

4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.

Class 3D

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.

3,398,336.—ELECTRICAL CHARGING UTILIZING TWO PHASE LIQUID MEDIUM. AUG. 20, 1968. CAN. 0815738, GRB. 1149074, JAP. 0562387.

3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.

3,907,559.—IMGNG PRCS EMPLYNG FRCTN CHRGNG IN THE PRESENCE OF AN ELECTRICALLY INSULATING DEVELOPER LIQUID. SEPT. 23, 1975.

3,971,658.—IMAGING PROCESS EMPLOYING FRICTION CHARGING IN THE PRESENCE OF AN ELECTRICALLY INSULATING LIQUID. JULY 27, 1976.

Class 3E

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

Class 3F

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.

2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.

2,955,938.—XEROGRAPHY - CHARGING PHOTOCONDUCTOR IN INSULATING. OCT. 11, 1960. CAN. 0603124.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,453,427.—ELEC LAMP FOR UNIFRMLY CHRGNG THE PHOTOCNDCTIVE INSULATNG LAYER OF A XEROGRAPHIC PLATE. JULY 1, 1969.
3,481,669.—PHOTO-CHARGING OF XEROGRAPHIC PLATES. DEC. 2, 1969. AUS. 0420860, BEL. 0705167, CAN. 0814631, FRA. 1541297, GER. 1522683, GRB. 1088073, JAP. 0517512.
3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972.
3,751,155.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. AUG. 7, 1973.
3,809,472.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. MAY 7, 1974. ARG. 0196103, AUS. 0466757, BEL. 0793559, CHL. 0027991, FRA. 7246234, GRB. 1415170, ITL. 0973319, JAP. 0552841, MEX. 0131207, NZL. 0169421, PRU. 0013334, PTG. 0058769, SAF. 0729132, SPN. 0410172, STZ. 0552841, SWD. 7216970.
3,845,307.—COMBINED CORONA AND LUMINESCENT DISCHARGE. OCT. 29, 1974. BEL. 0811310, GRB. 1433663.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,893,419.—BACKGROUND REDUCTION TECHNIQUE. JULY 8, 1975.
3,984,842.—DEVICE FOR CONTINOUS ELECTROSTATIC REPRODUCTION OF AN OPTICAL IMAGE. OCT. 5, 1976.
3,994,000.—DEVICE FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE USING A CHARGE STORAGE GRID. NOV. 23, 1976.
4,005,438.—DEVICE WITH CONTROL GRID FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE. JAN 25, 1977.

Class 4A

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.
4,068,950.—VARIABLE PLATEN COVER. JAN. 17, 1978.

Class 4A 1

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,808,023.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. OCT. 1, 1957.
2,812,883.—ELECTROPHOTOGRAPHIC DEVELOPING POWDER CLOUD GENERATING PROCESS AND APPARATUS. NOV. 12, 1957.
3,330,180.—ILLUMINATION CONTROL SYSTEM. JULY 11, 1967. ARG. 0151653, BRA. 0084295, CAN. 0785137, FRA. 1450157, GER. 1264239, GRB. 1122629, ITL. 0730678, JAP. 0508404, MEX. 0078870.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,487,252.—CESIUM LIGHT SOURCE. DEC. 30, 1969.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.
3,733,599.—TRIGGERING APPARATUS FOR A FLASH LAMP. MAY 15, 1973. CAN. 0937281, GRB. 1361073.
3,746,442.—ELECTROPHOTOGRAPHIC IMAGING APPARATUS. JULY 17, 1973.
3,767,956.—APERTURE FLUORESCENT LAMP FOR COPYING MACHINES. OCT. 23, 1973.
3,777,135.—ILLUMINATION SYSTEM. DEC. 4, 1973.
3,779,640.—HEATING APPARATUS FOR SCAN LAMP. DEC. 18, 1973. ITL. 0995677.
3,781,585.—LIGHT PRODUCING SYSTEM. DEC. 25, 1973.
3,824,013.—LIGHT SOURCE ALIGNMENT DEVICE. JULY 16, 1974.
3,851,201.—LAMP ASSEMBLY. NOV. 26, 1974.
3,868,182.—LAMP ASSEMBLY. FEB. 25, 1975.
3,869,205.—ILLUMINATION SOURCE FOR XEROGRAPHIC EXPOSURE. MAR. 4, 1975.
3,881,817.—OPTICAL ALIGNMENT SYSTEM FOR AN ORIGINAL DOCUMENT. MAY 6, 1975. CAN. 3881817.
3,893,754.—COMBINATION PARABOLOID-ELLIPSOID MIRROR SYSTEM. JULY 8, 1975.
3,904,290.—OPTICAL SYSTEM ALIGNMENT APPARATUS. SEPT. 9, 1975.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
3,914,649.—PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. OCT. 21, 1975.
3,961,222.—SODIUM VAPOR LAMP CONFIGURATION. JUNE 1, 1976.
3,967,893.—AN ILLUMINATING APPARATUS. JULY 6, 1976.
3,983,441.—MULTIPLE PINCH INCANDESCENT LAMP. SEPT. 28, 1976.
3,992,108.—OPTICAL SYSTEM ALIGNMENT APPARATUS. NOV. 16, 1976.
3,998,539.—AN ILLUMINATION SYSTEM. DEC. 21, 1976.
4,005,332.—EFFICIENT DC OPERATED FLUORESCENT LAMPS. JAN. 25, 1977.
4,005,940.—OPTICAL SYSTEM ALIGNMENT APPARATUS FEB. 1, 1977.
4,071,798.—SODIUM VAPOR LAMP WITH EMISSION APERTURE. JAN. 31, 1978.
4,071,799.—SODIUM VAPOR LAMP WITH EMISSION APERTURE. JAN. 31, 1978.
4,072,417.—EXPOSURE DEVICE FOR A XEROGRAPHIC COPYING MACHINE. FEB. 7, 1978.
4,080,545.—SODIUM VAPOR LAMP. MAR. 21, 1978.
4,086,010.—ILLUMINATION SYSTEM UTILIZING TWO OPPOSING DC LAMPS WITH AN OPTIMUM BARREL-SHAPED SLIT. APR. 25, 1978.

Class 4A 2

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.
2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,930,724.—MASKING APPARATUS FOR A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE JAN. 6, 1976.

Class 4A 2A

3,062,110.—EXPOSURE STATION APPARATUS. NOV. 6, 1962. CAN. 0701636, JAP. 0318676.
3,560,089.—PLATEN COVER. FEB. 2, 1971. BEL. 0736415, CAN. 0910104, FRA. 0024759, GRB. 1245543, ITL. 8691460, JAP. 0674392.
3,560,090.—PLATEN COVER. FEB. 2, 1971. CAN. 0910103.
3,615,134.—COUNTERBALANCED AND SELF-CLOSING PLATEN COVER. OCT. 26, 1971. ARG. 0185533, AUS. 0449673, BEL. 0756482, CAN. 0921744, CHL. 0025836, EGR. 0084323, FRA. 7035445, GRB. 1318753, GUA. 0002610, ITL. 0908279, MEX. 0116804, PLD. P143518, PNM. 0002181, SPN. 0384046, STZ. 0515525, TIW. 0006830, USR. 0439097.
3,642,371.—PLATEN COVER FOR COPYING MACHINE. FEB. 15, 1972. ARG. 0189873, BEL. 0768991, CAN. 0938485, FRA. 7124554, ITL. 0932443.
3,642,376.—REMOVABLE PLATEN COVER. FEB. 15, 1972. CAN. 0926919.
3,685,905.—COMBINED DOCUMENT FEED AND BOOK COPYING APPARATUS. AUG. 22, 1972. ARG. 0189167, BEL. 0782370, CAN. 0954579, FRA. 7214327, GRB. 1382646, ITL. 0959701, MEX. 0127002, VZL. 30688.
3,788,737.—LUMINESCENT COVER. JAN. 29, 1974. FRA. 7336535.
3,813,161.—PLATEN COVER. MAY 28, 1974.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.

3,914,049.—OPTICAL SCANNING SYSTEM. OCT. 21, 1975. BEL. 0815416.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,936,172.—LIQUID CRYSTALLINE PLATEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 3, 1976.
3,997,265.—PLATEN COVER. DEC. 14, 1976.

Class 4A 2A

4,045,218.—METHOD FOR ELECTROSTATICALLY PRODUCING A COLOR ACCENTED PHOTOCOPY. AUG. 30, 1977.
4,072,418.—DEVICE FOR PREVENTING MOVEMENT OF AN ORIGINAL DOCUMENT ON A RECIPROCATING COPIER PLATEN. FEB. 7, 1978.

Class 4A 3

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,672,759.—ILLUMINATION CONTROL SYSTEM. JUNE 27, 1972.
3,775,008.—OPTICAL SCANNING APPARATUS. NOV. 27, 1973.
3,829,209.—IMAGE REGISTRATION IN A MULTIPLE MAGNIFICATION PHOTOCOPY INH SYSTEM. AUG. 13, 1974. ARG. 0194481, BEL. 0784522, CAN. 0988146, FRA. 7220688, GRB. 1397446, ITL. 0956415, MEX. 0128160, SPN. 403.700, STZ. 0563605, SWD. 7207535.
3,926,518.—OPTICAL SCANNING SYSTEM. DEC. 16, 1975.
3,947,117.—EXPOSURE CONTROL SYSTEM. MAR. 30, 1976.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,995,954.—EXPOSURE SYSTEM. DEC. 7, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,080,071.—EXPOSURE DEVICE OF A COPYING MACHINE. MAR. 21, 1978.
4,098,552.—COPYING MACHINE. JULY 4, 1978.
4,101,807.—METHOD AND APPARATUS FOR CONTROLLING THE TEMPERATURE OF LOW PRESSURE METAL OR METAL HALIDE. JULY 18, 1978.

Class 4B

2,689,179.—XEROGRAPHIC CONTACT COPYING DEVICE. SEPT. 14, 1954.
3,912,387.—ELECTROSTATOGRAPHY. OCT. 14, 1975.
3,967,894.—A SCREENED OPTICAL SYSTEM. JULY 6, 1976.
3,967,895.—ILLUMINATION CONTROL SYSTEM. JULY 6, 1976.
3,981,577.—AN OPTICAL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 21, 1976.
3,994,723.—ELECTROPHOTOGRAPHIC PROCESS INVOLVING STEP OF SUBSEQUENT DISCHARGE OF AREAS RECEIVING INSUFFICIENT. NOV. 30, 1976.

Class 4B 1

2,583,546.—ELECTROPHOTOGRAPHIC RECORDING. JAN. 29, 1952.
3,062,094.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962. JAP. 0286655.
3,062,095.—PROJECTOR OPTICAL SCANNING SYSTEM. NOV. 6, 1962. CAN. 0706050.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,137,202.—OPTICAL SCANNING APPARATUS FOR XEROGRAPHIC PRINTERS. JUNE 16, 1964. CAN. 0685880.
3,221,622.—OPTICAL SCANNING SYSTEM. DEC. 7, 1965. ADN. 0000471, ARG. 0150818, ATR. 0267325, AUS. 0402541, BEL. 0657557, BRS. 00J3737, BRU. 0000469, CAN. 0756354, EIR. 0028649, FIJ. 0000342, FIN. 0045258, FRA. 1420763, GER. 1497089, GHA. 0000994, GIB. 1089536, GIE. 0006969, GRB. 1089536, GRK. 0029663, GUR. 1089536, HGK. 0009169, HOL. 0146615, ISR. 0022618, ITL. 0742392, JAP. 0599246, JER. 0000P96, KEN. 0001744, LXB. 0047657, MAU. 1927571, MLS. 0015069, NIG. 0001619, NOR. 0118726, NZL. 0140371, PTG. 0043364, SAF. 0646113, SBH. 0005269, SGP. 0008269, SHL. 0000017, SLN. 2677286, SPN. 0307501, SRK. 0000389, STZ. 0450920, SWD. 0338716, UGD. 0000269.
3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798356, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,484,163.—SCANNING SYSTEM. DEC. 16, 1969. CAN. 0840630.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157352, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,612,679.—SCANNING APPARATUS. OCT. 12, 1971. GRB. 1307918.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,794,418.—IMAGING SYSTEM. FEB. 26, 1974.
3,832,057.—SCANNING APPARATUS. AUG. 27, 1974. GRB. 1417255.
3,858,976.—OPTICAL SCANNING SYSTEM. JAN. 7, 1975.
3,869,204.—SCANNING OPTICAL SYSTEM. MAR. 4, 1975. BEL. 0815215.
3,905,247.—CLUTCHES. SEPT. 16, 1975.
3,918,806.—DASHPOT FOR COPIER OPTICAL SCANNING. NOV. 11, 1975.
3,936,173.—OPTICAL SYSTEM. FEB. 3, 1976.
3,948,374.—CLUTCHES. APR. 6, 1976.
3,950,091.—APPARATUS FOR CONTROLLING MOVEMENT OF A CARRIAGE. APR. 13, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,989,369.—SCANNING MECHANISM FOR A COPYING APPARATUS. NOV. 2, 1976.
4,027,961.—COPIER/RASTER SCAN APPARATUS. JUNE 7, 1977.
4,032,231.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM. JUNE 28, 1977. BEL. 0843419.
4,054,359.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR USING PULLEYS. OCT. 18, 1977.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,067,640.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR. JAN. 10, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.
4,068,950.—VARIABLE PLATEN COVER. JAN. 17, 1978.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,093,374.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE. JUNE 6, 1978. BEL. 843419, GRB. 1500877, SPN. 449267.
4,095,880.—EXTENDED RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE. JUNE 20, 1978. BEL. 843419, GRB. 1500877, SPN. 449267.

Class 4B 1A

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.
3,438,704.—ILLUMINATION CONTROL SYSTEM. APR. 15, 1969. CAN. 0865838, GRB. 1209473, JAP. 1002842.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815,

FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.

3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.

3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.

3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.

3,640,615.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 8, 1972. ARG. 0174792, AUS. 0428440, BEL. 0723948, CAN. 0884439, FRA. 1596660, GRB. 1223428, ITL. 0847541, JAP. 0992414, MEX. 0108966, PNM. 0001806, SPN. 0360210, SWD. 0352456, VZL. 0023711.

3,652,157.—MICROFILM PROJECTION APPARATUS. MAR. 28, 1972. CAN. 0937797, GRB. 1324097.

3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.

3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.

3,778,147.—ELECTROSTATIC REPRODUCTION MACHINE HAVING SLEECTSBLE MAGNIFICATIONRATIOS. DEC. 11, 1973. CAN. 989464.

3,788,740.—IMAGING SYSTEM. JAN. 29, 1974.

3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

3,994,580.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION. NOV. 30, 1976.

4,008,958.—OPTICAL SYSTEM FOR EFFECTED IMAGE ROTATION. FEB. 22, 1977.

4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

4,029,409.—MULTI-MODE OPTICAL SCANNING SYSTEM. JUNE 14, 1977. BEL. 0843153, HAT. 0001524.

4,088,401.—OPTICAL SYSTEM FOR ALTERNATIVELY PROJECTING ADJACENT IMAGES OF ADJACENT OBJECTS OR DOUBLE I. MAY 9, 1978.

Class 4B 1A 1

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.

3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.

3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.

3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.

3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.

3,881,369.—BI-AXIAL POSITIONER. MAY 6, 1975.

3,912,392.—SHORT FOCAL LENGTH OPTICAL SCANNING SYSTEM. OCT. 14, 1975.

Class 4B 1A 2

3,496,846.—SCRIPTWRITER USING FIBER OPTIC BUNDLE. FEB. 24, 1970.

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.

3,681,777.—RECORDING APPARATUS. AUG. 1, 1972.

Class 4B 1A 3

3,120,790.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 11, 1964. AUS. 0270483, FRA. 1333280, GER. 1204066, GRB. 1019291, ITL. 0674895, JAP. 0468454.

3,497,296.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 24, 1970.

3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.

3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.

3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.

3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.

3,914,040.—REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. OCT. 21, 1975.

3,958,877.—HALF-TONE SCREEN WITH CLEANING MEANS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAY 25, 1976.

3,961,847.—AN ARCUATE SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 8, 1976.

3,961,848.—AN ELECTROPHOTOGRAPHIC PRINTING MACHINE WITH HALFTONE SCREEN CLEANING. JUNE 8, 1976.

3,963,342.—CURVED SCREEN. JUNE 15, 1976.

3,973,953.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.

3,973,954.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.

3,973,957.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT. AUG. 10, 1976.

3,973,958.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR ELEMENT. AUG. 10, 1976.

4,003,649.—ELECTROPHOTOGRAPHIC HALFTONE PRINTING MACHINE EMPLOYING A PHASE SCREEN. JAN. 18, 1977.

4,007,981.—DUAL MODE ELECTROSTATOGRAPHIC PRINTING MACHINE. FEB. 15, 1977.

4,012,137.—AN OPTICAL SYSTEM HAVING A ROTATING SCREEN. MAR. 15, 1977.

4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.

4,014,030.—HALF-TONE IMAGING WITH FLYING SPOT SCANNER SYSTEM. MAR. 22, 1977.

4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.

4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.

4,035,070.—APPARATUS AND METHOD FOR OPTICAL GENERATION OF A STRUCTURED CHARGE-DISCHARGE PATTERN ON A PHOTO. JULY 12, 1977.

4,047,810.—DUAL MODE COPYING MACHINE. SEPT. 13, 1977.

4,072,414.—SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 7, 1978.

4,080,055.—A HALF-TONE COLOR COPIER. MAR. 21, 1978.

4,083,632.—MULTI FREQUENCY SCREEN. APR. 11, 1978.

4,090,786.—MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. MAY 23, 1978.

4,095,889.—EXPOSURE SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 20, 1978.

Class 4B 1A 4

3,424,525.—MICROFILM COPIER ATTACHMENT. JAN. 28, 1969.

3,542,468.—MICROFILM ENLARGER-COPIER - MICROFILM ATTACHMENT. NOV. 24, 1970. CAN. 0858250.

3,547,533.—MICROFILM REPRODUCTION MACHINE. DEC. 15, 1970. BEL. 0689227, CAN. 0891072, FRA. 1498788, GRB. 1160904, ITL. 0794772, MEX. 0095144.

4,046,473.—PHOTORECEPTOR METHOD AND SYSTEM. SEPT. 6, 1977.

Class 4B 2

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FPA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.

3,698,807.—DISPLAYING AND PRINTING APPARATUS. OCT. 17, 1972. CAN. 0963521, GRB. 1376814.

Class 4B 3

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.

3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.
4,066,353.—HALF TONE IMAGING SYSTEM. JAN. 3, 1978.
4,068,940.—VARIABLE CONTRAST OPTICAL SCREENING SYSTEM. JAN. 17, 1978.

Class 4B 4

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.
2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.
3,995,950.—EXPOSURE SYSTEM FOR ELECTROSTATIC MACHINES. DEC. 7, 1976.

Class 4B 5

3,094,910.—REFLEX XEROGRAPHIC APPARATUS. JUNE 25, 1963. CAN. 0704293, GRB. 0997415.
3,212,417.—REFLEX EXPOSURE SYSTEM. OCT. 19, 1965. CAN. 0733682, GRB. 1052783, JAP. 0487026.
3,278,302.—PHOSPHORESCENT SCREEN REFLEX. OCT. 11, 1966. CAN. 0748828.

Class 4B 6

3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,355,236.—AUTOMATIC OPTICAL CONTROL APPARATUS. NOV. 28, 1967. CAN. 0771917.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,765,027.—ION LENS RECORDING SYSTEM. OCT. 9, 1973.
3,848,996.—PHOTOCOMPOSING APPARATUS. NOV. 19, 1974. BEL. 0815043.
3,901,585.—ZOOM LENS ASSEMBLY. AUG. 26, 1975. GRB. 1443481.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
3,947,188.—VARIABLE CONJUGATE OPTICAL SYSTEM. MAR. 30, 1976.
3,967,896.—VARIABLE EDGE FADEOUT APP FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.
3,998,540.—REPOSITIONING SYSTEM FOR VIEWING AND PROJECTION ELEMENTS OF A REPRODUCING APPARATUS. DEC. 21, 1976.
4,013,361.—OPTICAL APP AND REPRODUCING MACHINE. MAR. 22, 1977. BEL. 0843158.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,691.—VARIABLE MAGNIFICATION REPRODUCING APPARATUS. JULY 5, 1977.
4,033,692.—MULTI-MODE REPRODUCING MACHINE. JULY 5, 1977. HAT. 0001504.
4,046,467.—ZOOM LENS COPIER. SEPT. 6, 1977.
4,053,221.—MULTI-MODE REPRODUCING APPARATUS. OCT. 11, 1977.
4,060,324.—LENS SWITCHING MECHANISM FOR USE IN COPYING MACHINE. NOV. 29, 1977.
4,076,388.—ZOOM LENS ASSEMBLY. FEB. 28, 1978. GRB. 1443481.
4,076,416.—ILLUMINATION SLIT FOR AND A PROCESS OF USE THEREOF IN A REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1584.
4,076,417.—INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1604.
4,101,213.—ZOOM LENS COPIER. JULY 18, 1978.

Class 4B 6A

3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798056, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427, ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157052, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.
3,912,374.—SIX COMPONENT ZOOM LENS. OCT. 14, 1975.
4,047,811.—AVAILABLE LIGHT MARGINAL ILLUMINATION SYSTEM. SEPT. 13, 1977.
4,056,308.—VARIABLE FOCAL LENGTH REFLECTOR LENS SYSTEM. NOV. 1, 1977.
4,057,342.—ILLUMINATION SLIT FOR A REPRODUCING MACHINE. NOV. 8, 1977.
4,061,419.—VARIABLE MAGNIFICATION LENS SYSTEM. DEC. 6, 1977.
4,076,389.—ZOOM LENS MOUNT AND MECHANISM. FEB. 28, 1978.

Class 4B 7

3,470,797.—DISPLAY DEVICE. OCT. 7, 1969.
3,472,136.—CHARACTER GENERATOR. OCT. 14, 1969. CAN. 0884500, GRB. 1191881.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,615,132.—METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS. OCT. 26, 1971.

3,620,618.—MULTIPLE INPUT COPYING APPARATUS. NOV. 16, 1971.
3,775,007.—FORMS REPRODUCTION APPARATUS. NOV. 27, 1973.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

Class 4C

2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,188,208.—SPECTRAL CONTRAST CONTROL IN XEROGRAPHY. JUNE 8, 1965.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,852,782.—IMAGING SYSTEM. DEC. 3, 1974.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,917,393.—VARIOSLIT. NOV. 4, 1975. BEL. 0820132.
3,970,382.—A SPATIALLY SELECTIVE OPTICAL SYSTEM. JULY 20, 1976. FRA. 7421348.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,066,351.—VARIABLE ILLUMINATION OPTICAL SYSTEM. JAN. 3, 1978.

Class 5

3,942,266.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. MAR. 9, 1976.
4,043,052.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. AUG. 23, 1977.

Class 5A 1

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,725,304.—PROCESS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. NOV. 29, 1955. CAN. 0557666.
2,792,971.—PARTICLE AEROSOL GENERATION. MAY 21, 1957.
2,815,330.—GENERATOR OF AEROSOL OF POWDER IN GAS. DEC. 3, 1957.
2,815,734.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGE. DEC. 10, 1957.
2,859,127.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 4, 1958. CAN. 0557667.
2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.
2,861,543.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGE. NOV. 25, 1958. CAN. 0597655.
2,862,472.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. DEC. 2, 1958. CAN. 0619384, FRA. 1210178, GER. 1121473, GRB. 0895777, ITL. 0594503.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.
2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,943,950.—ELECTROSTATIC DEVELOPING APPARATUS AND METHOD. JULY 5, 1960. CAN. 0564395.
3,008,826.—XEROGRAPHIC DEVELOPMENT. NOV. 14, 1961.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,276,426.—CLOSED AEROSOL DEVELOPMENT. OCT. 4, 1966.
3,518,969.—DEVELOPMENT APPARATUS. JULY 7, 1970. CAN. 0852127, GRB. 1259879.
3,791,730.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 12, 1974.
3,795,443.—XEROGRAPHIC DEVELOPMENT. MAR. 5, 1974. GRB. 1255568, JAP. 0721852.
4,096,826.—MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS. JUNE 27, 1978.

Class 5A 1A

2,824,545.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 25, 1958.
2,831,409.—XEROGRAPHIC CAMERA. APR. 22, 1958. CAN. 0575071.
3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.
3,129,113.—AUTOMATIC POWDER APPLICATOR APPARATUS. APR. 14, 1964.
3,640,246.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGE. FEB. 8, 1972. ATR. 0319044, AUS. 0457007, BEL. 0758632, CAN. 0917404, FRA. 7042231, GRB. 1336741, ITL. 0909113, JAP. 0815548, SPN. 0385187, STZ. 0527453, SWD. 0363411, USR. 0505386.
3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.
3,974,796.—DUAL MODE APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. AUG. 17, 1976.
4,033,292.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. JULY 5, 1977.

Class 5A 2

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.
2,811,135.—POWDER CHARGING DEVICE. OCT. 29, 1957.
2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.
2,894,486.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. JULY 14, 1959.
3,160,524.—APPARATUS FOR CHARGING POWDER PARTICLES AND APPLYING THE CHARGED PARTICLES TO A RECEIVING MEMBER. DEC. 8, 1964. CAN. 0779861, GRB. 1026457.
3,257,223.—ELECTROSTATIC POWDER CLOUD XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. JUNE 21, 1966. CAN. 0756559, GRB. 1028900, JAP. 0460474.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,357,403.—POWDER CLOUD DEVELOPMENT APPARATUS. DEC. 12, 1967.
3,470,009.—POWDER CLOUD DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 30, 1969. CAN. 0820240, FRA. 1461941, GRB. 1130452, HOL. 0142253, ITL. 0750148, JAP. 0512653, MEX. 0085176.
3,707,390.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. DEC. 26, 1972.
3,767,446.—DEVELOPMENT METHOD WITH OSCILLATING BRUSH PAD. OCT. 23, 1973.

Class 5A 3

RE.28,183.—POWDER CLOUD. OCT. 1, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
RE.28,193.—POWDER CLOUD XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 8, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
2,842,456.—PROCESS FOR DEVELOPING AN ELECTROSTATIC IMAGE. JULY 8, 1958.
2,911,945.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 10, 1959.
2,914,221.—AEROSOL BOMB DEVELOPMENT. NOV. 24, 1959.
2,918,900.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. DEC. 29, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
2,965,069.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.
3,648,901.—POWDER CLOUD XEROGRAPHIC DVLMNT APP-REISSUED AS 28183 AND 28193 10/74. MAR. 14, 1972. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

3,799,113.—HYBRID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. MAR. 26, 1974. CAN. 0980634, GRB. 1411708.
4,057,340.—SINGLE COMPONENT COLOR DEVELOPMENT SYSTEM. NOV. 8, 1977.

Class 5A 3A

2,832,511.—GENERATOR OF AN AEROSOL OF POWDER PARTICLES. APR. 29, 1958. CAN. 0705239, GER. 1170782, GRB. 0830780.
2,837,441.—XEROGRAPHIC WET BELT LOADING. JUNE 3, 1958.
2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,859,128.—METHOD OF DEVELOPING XEROGRAPHIC IMAGE. NOV. 4, 1958. CAN. 0612193, FRA. 1148569, GER. 1063898.
3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

Class 5A 3B

2,759,450.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 21, 1956. GRB. 0821337.
2,872,338.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 3, 1959.
2,877,132.—METHOD FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. MAR. 10, 1959.
2,928,575.—ELECTROSTATIC IMAGE DEVELOPMENT. MAR. 15, 1960. CAN. 0634369.
3,599,604.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 17, 1971. ARG. 0187552, ATR. 0300574, AUS. 0427548, BEL. 0726572, BUL. 0017289, CAN. 0882577, DNK. 0122194, EGR. 0074431, EIR. 0032989, FRA. 1597322, GRB. 1248671, GRK. 0039920, IND. 0120485, ISR. 0031892, ITL. 0854007, LXB. 0058261, MEX. 0108936, NZL. 0155879, PAK. 0121035, PLP. 0006856, PNM. 0001804, PTG. 0051418, RHD. 1406967, RMN. 0054927, SAF. 0069181, SPN. 0362359, STZ. 0493015, UAR. 0009253, VTM. 0001857, VZL. 0023728.
3,633,544.—TURBO-CLOUD DEVELOPMENT. JAN. 11, 1972. CAN. 0934959, GRB. 1322363, JAP. 0741518.
3,670,701.—TWO STEP ORBITAL PAD DEVELOPMENT. JUNE 20, 1972. CAN. 0092849, GRB. 1313870, JAP. 0743834.
3,882,822.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. MAY 13, 1975.

Class 5A 4

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.
2,824,813.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 25, 1958.

Class 5A 5

2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. CAN. 0834674, GRB. 107147, JAP. 0788652.
3,483,679.—FILTER APPARATUS. DEC. 16, 1969. BEL. 0708648, CAN. 0853503, FRA. 1552363, ITL. 0837050.
3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, FRA. 7401161, GRB. 1434673, ITL. 1003370.
3,937,570.—CLOUD SUPPRESSION IN AN ELECTROSTATIC COPYING APPARATUS. FEB. 10, 1976. CAN. 0974751, GRB. 1396922.

Class 5A 6

2,899,331.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGE WITH CHARCOAL. AUG. 11, 1959.

Class 5B

3,103,445.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON A XEROGRAPHIC PLATE. SEPT. 10, 1963, GRB. CAN. 0705363, GRB. 0956358.
3,251,706.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. MAY 17, 1966. CAN. 0629542, FRA. 1120534, GER. 1020234, GRB. 0774433.
3,357,402.—ROTARY BRUSH DEVELOPMENT. DEC. 12, 1967. ARG. 0167329, ATR. 0279354, AUS. 0416581, BEL. 0708497, BRA. 0088306, CAN. 0859029, FRA. 1548189, GER. 1597901, GRB. 1200068, HUN. 0156541, ITL. 0819626, JAP. 0608703, MEX. 0106260, PLD. 0071357, SPN. 0348633, SWD. 0328190, VZL. 0023686.
3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,558,339.—METHOD OF AND APPARATUS FOR STIPPLING. JAN. 26, 1971. CAN. 0871649, GRB. 1266969.
3,574,301.—DEVELOPING APPARATUS. APR. 13, 1971. AUS. 0449350, BEL. 0748073, CAN. 0873249, FRA. 7011549 GRB. 1303493, ITL. 0899146, JAP. 0715126, STZ. 0518579, SWD. 0356379, USR. 0331581.
3,592,167.—APPARATUS FOR LOADING TONER ON A DEVELOPING BRUSH. JULY 13, 1971.
3,613,638.—MATERIALS FOR FIBROUS DEVELOPMENT. OCT. 19, 1971. CAN. 0910736.
3,632,370.—MULTIPLE BRUSH DEVELOPMENT. JAN. 4, 1972.
3,636,924.—FUR BRUSH DEVELOPING APPARATUS. JAN. 25, 1972. CAN. 0912811, GRB. 1340060, JAP. 0751882.
3,638,613.—TONER DEVELOPER SYSTEM. FEB. 1, 1972. AUS. 0445403, BEL. 0747124, CAN. 0889762, EGR. 0081783, FRA. 7007651, GRB. 1294603, ITL. 0898243, SPN. 0377302, STZ. 0520960, SWD. 0354363, TIW. 0006827.
3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.
3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.
3,847,306.—DEVELOPING APPARATUS. NOV. 12, 1974. CAN. 0966998, GRB. 1353651.

Class 5C

3,648,657.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. MAR. 14, 1972.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,854,449.—DEVELOPMENT APPARATUS. DEC. 17, 1974. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414805, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,967,892.—A DEVELOPMENT SYSTEM. JULY 6, 1976.
3,981,272.—MAG BRUSH HOUSING WITH DETACHABLE SUMP SECTION. BEL. 0835755. SEPT. 21, 1976.
3,998,537.—SPLIT DEVELOPER HOUSING WITH INTERLOCKED FLOW GATE & CATCH. DEC. 21, 1976. BEL. 0835370.
4,027,621.—DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. JUNE 7, 1977.
4,039,102.—DEVELOPER DOOR WITH USE COUNTER ON DOOR. AUG. 2, 1977.
4,095,883.—MAGNETIC MIXING APPARATUS AND PROCESS. JUNE 20, 1978.

Class 5C 1

2,975,758.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 21, 1961. CAN. 0622422, GER. 1186746. GRB. 0944654, JAP. 0319308.
3,015,305.—DEVELOPMENT OF ELECTROSTATIC IMAGES. JAN. 2, 1962.
3,113,042.—XEROGRAPHIC APPARATUS WITH MAGNETIC CONVEYOR. DEC. 3, 1963. CAN. 0738917, GRB. 0987985.
3,176,652.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 6, 1965. CAN. 0737851, GRB. 1018787, JAP. 0627140.
3,570,453.—DEVELOPMENT APPARATUS. MAR. 16, 1971. ARG. 0181813, AUS. 0429322, BEL. 0737102, CAN. 0885918, CZC. 0161861, EGR. 0081317, FRA. 6927184, GRB. 1256282, ITL. 0869726, JAP. 0716364, SPN. 0370289, STZ. 0496263, SWD. 0353165, TIW. 0005357, USR. 0380031.

3,572,288.—DEVELOPMENT APPARATUS. MAR. 23, 1971. CAN. 0885917.
3,572,289.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAR. 3, 1971.
3,575,139.—ELECTROSTATIC MAGNETIC DEVELOPER UNIT GATING APPARATUS. APR. 20, 1971. CAN. 0930538.
3,583,364.—DEVELOPMENT APPARATUS. JUNE 8, 1971. BEL. 0738574, CAN. 0883725, FRA. 6930427, GRB. 1273187, ITL. 0871550, JAP. 0674394.
3,608,522.—XEROGRAPHIC DEVELOPMENT CONTROL APPARATUS. SEPT. 28, 1971. CAN. 0911704.
3,640,248.—ELECTROSTATIC MAGNETIC DEVELOPING APPARATUS—MULTIPLE MAGNETIC BRUSH UNIT. FEB. 8, 1972. ARG. 0184080, ATR. 0312419, AUS. 0437486, BEL. 0751486, BRA. 0088030, CAN. 0929337, CHL. 0026193, EGR. 0084331, FRA. 7020260, GRB. 1251477, ITL. 0893838, MEX. 0117951, NOR. 0133049, PNM. 0002537, SAF. 0703774, SPN. 0380378, STZ. 0509614, SWD. 0359664, TIW. 0007168, USR. 0419061, VZL. 0025834.
3,641,980.—DEVELOPMENT APPARATUS. FEB. 15, 1972. ARG. 0185081, AUS. 0445430, BEL. 0757698, CAN. 0913354, EGR. 0085713, FRA. 7038237, GRB. 1273456, ITL. 0909031, JAP. 0720627, MEX. 0118187, SPN. 0384576, STZ. 0516183, SWD. 0362510, TIW. 0006205.
3,665,891.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAY 30, 1972. CAN. 0914904, GRB. 1347138, JAP. 783770.
3,683,406.—MAGNETIC INCREMENTAL CASCADE DEVELOPMENT SYSTEM. AUG. 8, 1972. CAN. 0945200, GRB. 1335995, JAP. 0752521.
3,690,912.—METHOD FOR MAGNETIC DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE. SEPT. 12, 1972.
3,697,050.—CROSS MIXING BAFFLE. OCT. 10, 1972. CAN. 0951110.
3,709,713.—METHOD FOR MAGNETIC DEVELOPMENT. JAN. 9, 1973.
3,724,422.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 3, 1973. ARG. 0190744, AUS. 0457858, BEL. 0776598, CAN. 0951111, EGR. 0097962, FRA. 7145341, GRB. 1373010, ITL. 0943877, MEX. 0124647, SPN. 0397854, SWD. 0365880, USR. 0459904.
3,788,275.—MAGNETIC SHIELDING APPARATUS. JAN. 29, 1974. BEL. 0801242, CAN. 0973703, GRB. 1438332, ITL. 0990692.
3,828,728.—XEROGRAPHIC DEVELOPMENT SYSTEM. AUG. 13, 1974. BEL. 0791193, CAN. 0980635, FRA. 7240058, GRB. 1413337, ITL. 0970350, SWD. 7214311.
3,866,564.—MAGNETIC BRUSH DEVELOPING APPARATUS FOR COPIERS. FEB. 18, 1975.
3,872,830.—MAGNETIC BRUSH DEVELOPING APPARATUS. MAR. 25, 1975.
3,880,517.—REPRODUCTION MACHINE DEVELOPER APPARATUS. APR. 29, 1975.
3,880,518.—FLOATING DEVELOPER PLATEN FOR REPRODUCTION APPARATUS. APR. 29, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABLIZING PHOTORECEPTORS. JUNE 3, 1975.
3,893,815.—MAGNETIC BRUSH SUPPORT MEMBER. JULY 8, 1975.
3,906,121.—ELECTROSTATIC DEVELOPMENT METHOD USING MAGNETIC BUSH CONFIGURATION TRANSPORT. SEPT. 16, 1975. CAN. 0970631, GRB. 1381049.
3,906,898.—MAGNETIC BRUSH DEVELOPING APPARATUS. SEPT. 23, 1975.
3,911,864.—TONER PRELOADED MAGNETIC BRUSH DEVELOPMENT SYSTEM. OCT. 14, 1975. BEL. 0809859, STZ. 0568594.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.
3,921,577.—MAGNETIC DEVELOPMENT UNIT. NOV. 25, 1975.
3,926,516.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,927,640.—DEVELOPER SHUT-OFF APPARATUS. DEC. 23, 1975.
3,934,549.—TRANSFER APPARATUS. JAN. 27, 1976.
3,945,342.—MAGNETIC BRUSH SUPPORT MEMBER. MAR. 23, 1976.
3,948,217.—MAGNETIC BRUSH DEVELOPMENT SYSTEM WITH FLOATING DEVELOPMENT ROLLS. APR. 6, 1976. BEL. 0835370.
3,949,704.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 13, 1976.
3,950,089.—COATED ROLL FOR MAGNETIC BRUSH DEVELOPMENT & CLEANING SYSTEMS. APR. 13, 1976.
3,953,121.—ARTICULATED DEVELOPMENT APPARATUS. APR. 27, 1976. IRN. 0013434.
3,962,003.—METHOD OF FORMING MAGNETIC BRUSH SUPPORT MEMBER. JUNE 8, 1976.
3,968,773. JULY 13, 1976.
3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.
3,991,713.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. NOV. 16, 1976.
3,996,892.—SPATIALLY PROGRAMMABLE ELECTRODE TYPE ROLL FOR ELECTROSTATOGRAPHIC PROCESSORS AND THE LIKE. DEC. 14, 1976.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.
4,033,294.—DEVELOPER MIXING AND TRANSPORTING AUGER FOR MAGNETIC BRUSH DEVELOPING APPARATUS. JULY 5, 1977.
4,034,709.—AN IMPROVED DEVELOPER ROLL. JULY 12, 1977.
4,044,719.—DEVELOPING APPARATUS IN ELECTROCOPYING MACHINES. AUG. 30, 1977.
4,050,413.—MAGNETIC BRUSH CROSSMIXING SYSTEM. SEPT. 27, 1977.
4,057,666.—MAGNETIC BRUSH DEVELOPER ROLL FOR ELECTROSTATIC REPRODUCTION MACHINES. NOV. 8, 1977.
4,077,358.—DEACTIVATING DEVICE FOR A MAGNETIC BRUSH DEVELOPER USED IN A MULTICOLOR ELECTROPHOTOGRAPHIC. MAR. 7, 1978.
4,078,520.—VIBRATING SCREEN FILTER FOR TONER DENSITY MEASURING APPARATUS. MAR. 14, 1978.
4,084,542.—POSITIONING APPARATUS FOR MAGNETIC BRUSH DEVELOPING DEVICE. APR. 18, 1978.
4,086,006.—PURGING SYSTEM FOR A DEVELOPMENT APPARATUS. APR. 25, 1978.
4,096,826.—MAGNETIC BRUSH DEVELOPMENT SYSTEM FOR FLEXIBLE PHOTORECEPTORS. JUNE 27, 1978.
4,098,228.—HIGH SPEED MAGNETIC BRUSH DEVELOPMENT SYSTEM. JULY 4, 1978.

Class 5C 1A

2,832,311.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 29, 1958. CAN. 0605908, GRB. 0889202.
3,584,601.—MAGNETIC BRUSH BELT DEVELOPMENT. JUNE 15, 1971. CAN. 0884799, GRB. 1238277.
3,592,166.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. JULY 13, 1971. CAN. 0887598, GRB. 1275822, JAP. 1162298.
3,638,614.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0929338, GRB. 1304236, JAP. 0808219.
3,741,790.—METHOD FOR MAGNETICALLY DEVELOPING ELECTROSTATIC IMAGES. JUNE 26, 1973.
3,823,688.—MAGNETIC BRUSH ASSEMBLY. JULY 16, 1974. BEL. 0794507, CAN. 0989607, FRA. 7302247, GRB. 1394502, SWD. 7301014.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 1B

3,532,071.—DEVELOPMENT APPARATUS. OCT. 6, 1970. CAN. 0883763, GRB. 1227549, JAP. 0650630.
3,552,355.—DEVELOPMENT APPARATUS. JAN. 5, 1971. ARG. 0175330, ATR. 0300575, AUS. 0441519, BEL. 0730371, CAN. 0914005, CZC. 0161850, DNK. 0129880, EGR. 0077412, EIR. 0032786, FRA. 6909741, GRB. 1263566, GRK. 0039919, IND. 0120212, ISR. 0031757, ITL. 0860255, LXB. 0058295, MEX. 0111374, NOR. 0128037, NZL. 0155695, PAK. 0120989, PLD. 0017651, PLP. 0006606, PNM. 0001723, PTG. 0051392, RHD. 1156947, SAF. 0691728, SPN. 0365439, STZ. 0499140, SWD. 0341530, TIW. 0006602, UAR. 0009242, USR. 0383338, VTM. 0001829, VZL. 0023745.
3,645,770.—METHOD FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 29, 1972.
3,893,414.—METHOD AND APP FOR VARYING DEVELOPER BANDWIDTH. JULY 8, 1975.
3,908,596.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. SEPT. 30, 1975.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,990,393.—APPARATUS FOR DEPOSITING MAGNETIC MATERIAL ON AN IMAGE BEARING MEMBER. NOV. 9, 1976.
3,998,184.—A DEVELOPMENT APPARATUS. DEC. 21, 1976.

4,025,179.—PASSIVE CROSS MIXING SYSTEM. MAY 24, 1977.

Class 5C 2

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.
4,053,218.—DEVELOPMENT SYSTEM. OCT. 11, 1977.
4,082,061.—MULTI-COLOR DEVELOPMENT SYSTEM. APR. 4, 1978.
4,087,168.—CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. MAY 2, 1978.

Class 5C 3

2,846,333.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. AUG. 5, 1958. CAN. 0609146.
3,906,897.—DEVELOPMENT APPARATUS. SEPT. 23, 1975. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,940,272.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. FEB. 24, 1976. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
4,102,305.—DEVELOPMENT SYSTEM WITH ELECTRICAL FIELD GENERATING MEANS. JULY 25, 1978.

Class 5D

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.
3,768,904.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. OCT. 30, 1973.
3,793,985.—IMAGING SYSTEM. FEB. 26, 1974.
3,924,944.—SPLIT DEVELOPER HOUSING. DEC. 9, 1975.
4,015,561.—ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSOR. APR. 5, 1977.
4,095,883.—MAGNETIC MIXING APPARATUS AND PROCESS. JUNE 20, 1978.

Class 5D 1

3,219,014.—MECHANICAL SHIELD TO PROTECT MAGNETIC CORE IN XEROGRAPHIC DEVELOPING APPARATUS. NOV. 23, 1965. CAN. 0757573, FRA. 1393298, GER. 1497076, GRB. 1034099, ITL. 0710188, JAP. 0477812.
3,685,488.—XEROGRAPHIC DEVELOPMENT. AUG. 22, 1972.
3,884,571.—LEAKAGE DEVELOPER RECIRCULATION. MAY 20, 1975. HOL. 3884571.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

Class 5D 1A

2,705,199.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAR. 29, 1955. CAN. 0525077.
3,067,720.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 11, 1962. ARG. 0175377, BEL. 0750689, PNM. 0002011, VZL. 0025828.
3,095,325.—TONER DISPENSER DRIVE MECHANISMS. JUNE 25, 1963.
3,190,264.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 22, 1965. CAN. 0733036.
3,303,817.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 14, 1967.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.
3,635,553.—CASCADE DEVELOPING APPARATUS UTILIZING A ROTARY WHEEL WITH SCOOPS. JAN. 18, 1972.
3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,678,896.—CONVEYOR SYSTEM. JULY 25, 1972. CAN. 0952465, GRB. 1325831.

Class 5D 1B

3,122,454.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 25, 1964.
3,435,803.—LIFTING APPARATUS. APR. 1, 1969. CAN. 0937394, FRA. 1511169, GER. 1456806, GRB. 1165378, ITL. 0788954, JAP. 0542586, MEX. 0095039.
3,448,724.—DEVELOPING APPARATUS. JUNE 10, 1969. ARG. 0174576, AUS. 0430081, BEL. 0726573, CAN. 0884214, CZC. 0157054, EGR. 0077413, FRA. 1598024, GRB. 1258781, ITL. 0854008, JAP. 0665972, MEX. 0107603, PNM. 0001429, RMN. 0054735, SAF. 0069179, SPN. 0362358, STZ. 0486057, SWD. 0338507, USR. 0410595, VZL. 0023716.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,606,533.—XEROGRAPHIC DEVELOPMENT. SEPT. 20, 1971.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,835,811.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 17, 1974.
3,888,578.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 10, 1975.
3,900,255.—PADDLE-WHEEL DEVELOPMENT SYSTEM. AUG. 19, 1975.

Class 5D 1C

2,880,696.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. APR. 7, 1959. CAN. 0698394.
3,117,891.—XEROGRAPHIC APPARATUS. JAN. 14, 1964. CAN. 0740394, GRB. 1006078.
3,287,150.—CASCADE DEVELOPMENT PROCESS W/TWO-COMPONENT DEVELOPER. NOV. 22, 1966.
3,415,224.—MAGNETIC CASCADE DEV APPARATUS. DEC. 10, 1968. AUS. 0423497, BEL. 0725943, CAN. 0852660, COR. 000948A, EGR. 0074432, FRA. 1603904, GRB. 1217281, ITL. 0849521, LXB. 0057873, MRC. 0014726, PTG. 0051108, SAF. 0688440, SPN. 0361840, STZ. 0493872, SWD. 0345753, SYA. 0002440, ZMB. 0166972.
3,667,427.—CASCADE APPARATUS. JUNE 6, 1972. CAN. 0951112, GRB. 1377152.
3,678,897.—DEVELOPER MIXING APPARATUS. JULY 25, 1972. BEL. 0778426, CAN. 0951113, FRA. 7203212, GRB. 1377151, ITL. 0946909.
3,741,372.—CONVEYOR FOR DEVELOPER APPARATUS. JUNE 26, 1973.

Class 5D 1D

2,889,234.—XEROGRAPHIC DEVELOPMENT PROCESS. JUNE 2, 1959.
3,550,555.—XEROGRAPHIC DEVELOPER SEPARATION. DEC. 29, 1970. CAN. 0855652, GRB. 1238032.

Class 5D 2

3,105,770.—CASCADE DEVELOPMENT IMPROVEMENT. OCT. 1, 1963. AUS. 0252867, BEL. 0749545, CAN. 0746453, FRA. 1286397, GER. 1278244, GRB. 0986844, ITL. 0648862, JAP. 0517396.
3,375,807.—XEROGRAPHIC DEVELOPER. APR. 2, 1968. CAN. 0819049, MEX. 0092092, VZL. 0024448.
3,542,579.—ELECTROSTATIC IMAGE DEVELOPMENT. NOV. 24, 1970.
3,973,517.—DEVELOPMENT DEVICE AND METHOD. AUG. 10, 1976.

Class 5D 3

3,057,324.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 9, 1962.
3,336,905.—XEROGRAPHIC DEVELOPER APPARATUS. AUG. 22, 1967. CAN. 0793223, GRB. 1123059, JAP. 0508405.
3,428,025.—XEROGRAPHIC DEVELOPMENT APPARATUS-POWDER CLOUD BY CHARGE BREAKDOWN. DEC. 18, 1969.
3,638,610.—DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0916432, FRA. 7041622.
3,638,611.—ELECTRODED DEVELOPMENT DEVICE. FEB. 1, 1972. ARG. 0184658, ATR. 0308537, AUS. 0446323, BEL. 0752936, CAN. 0913893, CHL. 0025914, DNK. 0129305, EGR. 0084129, FRA. 7024067, GRB. 1258738, GUA. 0002615, IND. 0127311, ITL. 0900196, JAP. 0719143, MEX. 0115403, NOR. 0130134, NZL. 0160644, PLD. 0081287, PLP. 0006288, PNM. 0002266, PTG. 0054072, SAF. 0704532, SPN. 0381383, STZ. 0520961, SWD. 0359386, TIW. 0005923, USR. 0414818.
3,682,132.—AUTOMATIC DEVELOPER CONTROLLER. AUG. 8, 1972.

Class 5D 4

3,347,691.—XEROGRAPHIC DEVELOPMENT. OCT. 17, 1967. ARG. 0168482, CAN. 0827608, FRA. 1497061, GRB. 1166464, ITL. 0788454, JAP. 0589492, MEX. 0093822, VZL. 0032595.
3,412,710.—CLEAN UP ELECTRODE. NOV. 26, 1968. BEL. 0704923, CAN. 0867283, FRA. 1540699, GRB. 1196637, ITL. 0814605, JAP. 0585018.
3,620,191.—BIASED INPUT CHUTE. NOV. 16, 1971. ARG. 0199542, ATR. 0324837, AUS. 0446250, BEL. 0752943, CAN. 0918411, CHL. 0025871, DNK. 0128800, EGR. 0083704, FRA. 7024665, GRB. L310444, GUA. 0002727, IND. 0127313, ITL. 0900192, JAP. 0731612, MEX. 0114979, NOR. 0132115, NZL. 0160647, PLP. 0008638, PNM. 0002269, PTG. 0054075, SAF. 70/4534, SPN. 0381382, STZ. 0528761, SWD. 0359387, TIW. 0007164, USR. 0358874.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,682,538.—XEROGRAPHIC PICK-OFF PLATE. AUG. 8, 1972. ARG. 0186267, BEL. 0764562, CAN. 0935635, FRA. 7110750, GRB. 1349272, ITL. 0922348, MEX. 0119677, USR. 0426387.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,807,997.—PLURAL ELECTRODE DEVELOPMENT METHODS FOR LATENT ELECTROSTATIC IMAGES. APR. 30, 1974. CAN. 0979299, GRB. 1381910.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.

Class 5D 5

2,550,724.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE. MAY 1, 1951.
2,550,738.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE - TRAY WITH GATES. MAY 2, 1951.
2,635,046.—DEVELOPING DEVICE FOR ELECTROSTATIC IMAGES. APR. 14, 1953.
2,827,013.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 18, 1958.
3,223,548.—XEROGRAPHIC DEVELOPING MACHINE AND METHOD. DEC. 14, 1965.
3,316,878.—CASCADE DEVELOPING APPARATUS. MAY 2, 1967.

Class 5E

3,357,399.—COMBINED FLUIDIZED BED AND INVERTED CASCADE DEVELOPMENT APPARATUS. DEC. 12, 1967. ARG. 0171121, CAN. 0821473, CHL. 0022944, MEX. 0096075, PRU. 0009332, URG. 0008548, VZL. 0021060.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,748,126.—MULTIPLE COPY SELECTIVE RE-WETTING PRINTING. JULY 24, 1973.
3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.
3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.
3,865,611.—METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY CONDUCTIVE. FEB. 11, 1975.
3,893,854.—PHOTOGRAPHIC ARTICLES WITH GAPS FOR PROCESSING FLUIDS. JULY 8, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975, GRB. 1438660.
3,927,934.—ELECTROSTATOGRAPHIC REPRODUCTION MACHINES. DEC. 23, 1975.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,951,653.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. APR. 20, 1976.
3,973,699.—LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON. AUG. 10, 1976, GRB. 1455885.
3,974,554.—QUANDRANGULAR TRIHETICORD GRAVURE ROLL. AUG. 17, 1976, BEL. 0841855.
3,978,817.—PATTERNED GRAVURE & DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,020,788.—DOCTORING MEANS. MAY 3, 1977.
4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.
4,024,834.—TEMPERATURE COMPENSATED DOCTOR BLADE. MAY 24, 1977. GRB. 1430518.
4,037,952.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. JULY 26, 1977.
4,068,938.—ELECTROSTATIC COLOR PRINTING USING DISCRETE POTENTIALS. JAN. 17, 1978. GRB. 1442234.

Class 5E 1

2,551,582.—METHOD OF PRINTING AND DEVELOPING SOLVENT IMAGES - ELECTROPHOTOGRAPHY. MAY 8, 1951.
2,965,482.—METHOD FOR FIXING XEROGRAPHIC IMAGES. DEC. 20, 1960.
3,005,726.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES. OCT. 24, 1961.

Class 5E 2

3,068,115.—ELECTROSTATIC EMULSION DEVELOPMENT. DEC. 11, 1962. GER. 1302344, GRB. 1006230, JAP. 0466442.
3,730,708.—ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER. MAY 1, 1973.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,862,618.—LIQUID DEVELOPING APPARATUS DEVELOPING AN ELECTROSTATIC IMAGE. JAN. 28, 1975.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
4,007,401.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.

Class 5E 3

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

Class 5E 4

3,010,842.—DEVELOPMENT OF ELECTROSTATIC IMAGES. NOV. 28, 1961. CAN. 0704604.
3,064,622.—IMMERSION DEVELOPMENT. NOV. 20, 1962. CAN. 0729544, FRA. 1296944, GER. 1190787, GRB. 0990968, JAP. 0451638.
3,129,115.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 14, 1964. GRB. 1008004.
3,251,688.—LIQUID TRANSFER DEVELOPMENT. MAY 17, 1966. CAN. 0765523, FRA. 1362253, GRB. 1032013.
3,270,637.—ELECTROVISCOUS RECORDING. SEPT. 6, 1966. AUS. 0403009, CAN. 0740112, FRA. 1414126, GER. 1497109, GRB. 1086197, HOL. 0141644, ITL.

0738077, JAP. 0508403, NOR. 0127882, STZ. 0472710, SWD. 0331032.

3,281,241.—METHOD OF FORMING A VISUAL RECORD OF A LATENT IMAGE RECEIVING WEB. OCT. 25, 1966. AUS. 0275028, CAN. 0766420, FRA. 1362254, GER. 1303008, GRB. 1035236, ITL. 0699412, JAP. 0470426.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,334,613.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 8, 1967. CAN. 0787870, GRB. 1125628, JAP. 0546654.

3,369,918.—DEV OF LATENT ELECTROSTATIC IMGS W/ CREATED WAVES OF LIQUID DEVELOPER. FEB. 20, 1968.

3,576,623.—DEVELOPMENT SYSTEM EMPLOYING A CORONODE IMMERSED IN A LIQUID DEVELOPER. APR. 27, 1971. AUS. 0434437, CAN. 0872191, GER. 1908292, GRB. 1259880, JAP. 0675662.

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TONER-FREE ZONE. MAY 4, 1971.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,627,410.—REPRODUCTION APPARATUS WITH LIQUID. DEC. 14, 1971. CAN. 0886508.

3,627,557.—LIQUID DVLPMNT BY REDUCING VISCOSITY OF DVLPR ON ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.

3,642,471.—LIQUID DEVELOPING PROCESS IN AN ELECTROSTATOGkAPHIC IMAGING SYSTEM. FEB. 15, 1972.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.

3,672,884.—ELECTROSTATIC PRINTING. JUNE 27, 1972.

3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.

3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.

3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.

3,808,025.—LIQUID DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. APR. 30, 1974.

3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.

3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.

3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974.

3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.

3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.

3,862,619.—ELECTRO-PHOTOGRAPHIC APPARATUS. JAN. 28, 1975.

3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.

3,870,514.—LIQUID DEVELOPMENT FOR THE ELECTRONIC PHOTOGRAPHY. MAR. 11, 1975.

3,877,934.—INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT. APR. 15, 1975.

3,890,040.—INDUCTION IMAGING APPARATUS. JUNE 17, 1975.

3,913,524.—LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 21, 1975.

3,926,825.—LIQUID DEVELOPER COMPOSITION AND PROCESS FOR PREPARING SAME. DEC. 16, 1975.

3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, 0033335.

3,943,268.—LIQUID DEVELOPER PROCESS AND APP FOR ELECTROSTATOGRAPHY. MAR. 9, 1976. CAN. 0904683.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.

3,970,043.—ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT. AUG. 20, 1976.

3,971,659.—COLOR ELECTROPHOTOGRAPHIC PROCESS USING PHOTO CONDUCTIVE PARTICLES IN LIQUID DEVELOPER. JULY 27, 1976.

3,972,305.—IMAGING SYSTEM. AUG. 3, 1976. CAN. 0904683.

3,976,808.—IMAGING SYSTEMS. AUG. 24, 1976.

3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5E 5

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.

3,372,027.—XEROGRAPHIC LIQUID DEVELOPMENT. MAR. 5, 1968. CAN. 0800963, GRB. 1091169, ITL. 0760712, JAP. 0571175.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,667,428.—DEVELOPING SYSTEMS. JUNE 6, 1972. ARG. 0195534, ATR. 0312420, AUS. 0456202, BEL. 0752805, CAN. 0904107, CHL. 0026274, CZC. 0164275, DNK. 0126528, EGR. 0083514, FRA. 7024066, GRB. 1320232, ITL. 0894827, JAP. 0745765, MEX. 0114978, PNM. 0002541, SAF. 0704475, SPN. 0194607, STZ. 0543753, SWD. 0366126, TIW. 0006616, USR. 0420196.

3,676,215.—IMAGING SYSTEM. JULY 11, 1972. ARG. 0182525, AUS. 0430692, BEL. 0732139, CAN. 0900770, FRA. 6913232, GRB. 1272306, ITL. 0857440, JAP. 0698292, MEX. 0109289, PNM. 0001433, SPN. 0386902, SWD. 0352117, USR. 0309549.

3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.

3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.

3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.

3,795,530.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT. MAR. 5, 1974.

3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.

3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.

3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.

3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.

3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.

3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.

3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.

3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.

3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, VZL. 0033335.

3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.

3,978,817.—PATTERNED GRAVURE AND DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,985,663.—CONDUCTIVE INKS CONTAINING QUATERNARY AMMONIUM COMPOUNDS. OCT. 12, 1976.
3,993,023.—COATED FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,993,024.—FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,004,931.—CONSTANT VISCOSITY INKS. JAN. 25, 1977.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.
4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.
4,042,415.—METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE. AUG. 16, 1977.
4,043,657.—BLADE FOR METERING LIQUID DEVELOPER. AUG. 23, 1977. GRB. 1501464.
4,047,943.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER. SEPT. 13, 1977.
4,049,344.—ELECTROSTATIC IMAGING SYSTEM. SEPT. 20, 1977.
4,059,444.—LIQUID DEVELOPMENT USING CONDUCTIVE INKS. NOV. 22, 1977. GRB. 1495785.
4,089,683.—LIQUID DEVELOPER CLEANING MEANS. MAY 16, 1978.

Class 5F

2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,844,123.—BELT DEVELOPMENT ELECTRODE. JULY 22, 1958.
2,880,699.—XEROGRAPHIC DEVELOPMENT. APR. 7, 1959.
2,895,847.—ELECTRIC IMAGE DEVELOPMENT. JULY 21, 1959. CAN. 0558894.
2,918,898.—XEROGRAPHIC BELT LOADING APPARATUS. DEC. 29, 1959. CAN. 0611529.
3,124,483.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. MAR. 10, 1964. CAN. 0843622.
3,166,432.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0675704, FRA. 1260844, GER. 1185062, GRB. 0959668, JAP. 0401040.
3,203,394.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 31, 1965. CAN. 0757572, GER. 1497070, GRB. 1026704, JAP. 0464922.
3,216,844.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES WITH PHOTOCONDUCTIBLE DONOR MEMBER. NOV. 9, 1965. CAN. 0794035, GRB. 1024983.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,332,396.—XEROGRAPHIC DEVELOPING APPARATUS WITH CONTROLLED CORONA MEANS. JULY 25, 1967. AUS. 0287695, BEL. 0656893, CAN. 0775061, FRA. 1419973, GER. 1288915, GRB. 1060679, ITL. 0745583.
3,375,806.—XEROGRAPHIC DONOR DEVELOPMENT APPARATUS. APR. 2, 1968.
3,376,852.—DIELECTRIC BELT DEVELOPING. APR. 9, 1968. CAN. 0859028, GRB. 1214512, JAP. 0919364.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,606,864.—DONOR ASSEMBLY. SEPT. 21, 1971. CAN. 0903461, GRB. 1280951, MEX. 0116025.
3,613,636.—ELECTROGRAPHIC DEVELOPER. OCT. 19, 1971. GRB. 1282991.
3,635,196.—PNEUMATICALLY CONTROLLED SEAL. JAN. 18, 1972.
3,645,618.—VACUUM NOZZLE TO REMOVE AGGLOMERATES ON A TONER APPLICATOR. FEB. 29, 1972. CAN. 0949823.
3,696,783.—AUTOMATED TOUCHDOWN DEVELOPMENT SYSTEM. OCT. 10, 1972. CAN. 0949822, GRB. 1373666.
3,696,785.—DEVELOPMENT APPARATUS. OCT. 10, 1972. CAN. 0949824, GRB. 1373665.
3,697,169.—ELECTROSTATIC RECORDING APPARATUS AND METHOD. OCT. 10, 1972. CAN. 0954292, GRB. 1322681.
3,703,157.—MTHD/APPRTS FOR FRMNG UNFRM LYR OF PWDR DVELPR ON A SURFACE. NOV. 21, 1972.
3,707,389.—LATENT ELECTROSTATIC IMAGE DEVELOPMENT. DEC. 26, 1972. AUS. 0457281, BEL. 0777721, CAN. 0949827, FRA. 7201007, GRB. 1375048, ITL. 0946354.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,739,748.—DONOR FOR TOUCHDOWN DEVELOPMENT. JUNE 19, 1973.
3,759,222.—MICROFIELD DONOR WITH CONTINUOUSLY REVERSING MICROFIELDS. SEPT. 18, 1973. BEL. 0780091, CAN. 0951596, FRA. 7208102, GRB. 1385966, ITL. 0949779.
3,848,566.—DONOR APPARATUS. NOV. 19, 1974.
3,866,574.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 18, 1975, FRA. 7405248, GRB. 1458766.
3,881,927.—HALF TONE DEVELOPMENT PROCESS FOR TOUCHDOWN SYSTEM IN ELECTROSTATIC IMAGING. MAY 6, 1975. GRB. 1419926.
3,884,185.—COATED WIRE DEVELOPER BRUSH. MAY 20, 1975.
3,890,929.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 24, 1975.
3,893,418.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,900,002.—DONOR APPARATUS. AUG. 19, 1975.
3,914,460.—DEVELOPMENT UTILIZING ELECTRIC FIELDS. OCT. 21, 1975.
3,929,098.—TONER LOADING FOR TOUCHDOWN DONOR. DEC. 30, 1975.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,997,688.—DEVELOPING AN ELECTRICAL IMAGE. DEC. 14, 1976.
3,998,185.—MICROFIELD DONORS WITH TONER AGITATION AND THE METHODS OF THEIR MANUFACTURE. DEC. 21, 1976.
3,999,515.—SELF SPACING MICROFIELD DONORS. DEC. 28, 1976.
3,999,849.—TOUCHDOWN AMBIPOLAR DEVELOPMENT. DEC. 28, 1976.
4,003,333.—DEVELOPMENT SYSTEM. JAN. 18, 1977.
4,006,981.—HALF TONE DEVELOPMENT FOR TOUCHDOWN SYSTEM. FEB. 8, 1977. GRB. 1419926.
4,011,834.—TOUCHDOWN ELECTROSTATIC DEVELOPMENT APPARATUS. MAR. 15, 1977.
4,017,648.—TONER AGITATION THROUGH MICROFIELD DONOR. APR. 12, 1977.
4,025,185.—APPLICATOR MEMBER. MAY 24, 1977. GRB. 1436098.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.
4,067,295.—MAGNETIC MICROFIELD DONOR SYSTEM. JAN. 10, 1978.
4,092,165.—METHOD OF MAKING A DONOR MEMBER MOLD. MAY 30, 1978.

Class 5G

3,380,437.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT APPARATUS. APR. 30, 1968. ARG. 0179553, BRA. 0088502, CAN. 0821491, CHL. 0022941, CLB. 0016330, MEX. 0095936, PRU. 0009315, URG. 0008636, VZL. 0020996.
3,393,663.—FLUIDIZING ELECTRODE DEVELOPMENT APPARATUS. JULY 23, 1968. ARG. 0171118, AUS. 0411962, BEL. 0701467, CAN. 0821472, CHL. 0024009, CLB. 0017645, CZC. 0157025, DNK. 0123998, EGR. 0072982, FRA. 1531274, GRB. 1193443, ISR. 0028298, ITL. 0805956, LXB. 0054062, MEX. 0095697, NOR. 0127834, NZL. 0149432, PLD. 0069038, PTG. 0048069, SAF. 0674268, SPN. 0343103, STZ. 0481406, SWD. 0322414, USR. 0353449, VZL. 0021059.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.

3,574,660.—ORBITAL DEVELOPER STREAM DEVELOPMENT. APR. 13, 1971. CAN. 0845076, GRB. 1193277.
3,641,977.—APPARATUS FOR AGITATING DEVELOPER MATERIAL WITHIN A HOUSING. FEB. 15, 1972. CAN. 0917405, GRB. 1342684.
3,682,137.—J-SHELL DEVELOPER HOUSING. AUG. 8, 1972. CAN. 0949820, GRB. 1342782.
3,900,001.—DEVELOPING APPARATUS. AUG. 19, 1975. CAN. 0970631, GRB. 1381049.

Class 5H

2,761,416.—DEVELOPMENT MECHANISM FOR ELECTROSTATIC IMAGES. SEPT. 4, 1956.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,484,265.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT METH. DEC. 16, 1969.
3,503,776.—XEROGRAPHIC DEVELOPMENT. MAR. 31, 1970. CAN. 0828694, FRA. 1511809, GRB. 1182291, ITL. 0793692, MEX. 0098765.
3,611,991.—VIBRATING BED DEVELOPING APPARATUS WITH ELECTROMAGNETIC DEVELOPER AGITATOR. OCT. 12, 1971. AUS. 0445409, BEL. 0755605, CAN. 0911707, EGR. 0083516, FRA. 7032503, GRB. 1264780, ITL. 0907435, JAP. 0745766, SPN. 0383333, STZ. 0521615, SWD. 0361956, TIW. 0007201, USR. 0371738.
3,613,637.—DEVELOPER FOR ELECTROSTATIC IMAGES. OCT. 19, 1971. AUS. 0448238, BEL. 0752034, CAN. 0911702, FRA. 7021987, GRB. 1301157, ITL. 0894180, SWD. 0358975.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.
3,623,454.—FLUIDIZED BED DEVELOPMENT APPARATUS. NOV. 30, 1971. CAN. 0895208, GRB. 1272373, JAP. 0731616.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,685,486.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 22, 1972. CAN. 0921693, GRB. 1316306, JAP. 0746925.
3,754,531.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 28, 1973.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

Class 5I

3,838,922.—APPARATUS FOR SENSING THE QUANTITY OF RECLAIMED DEVELOPER MATERIAL. OCT. 1, 1974. CAN. 0992600, GRB. 1414319.
3,841,265.—DEVELOPER ASSEMBLY FOR ELECTROSTATIC COPIER. OCT. 15, 1974.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.
3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

Class 5I 1

3,316,875.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 2, 1967.
3,331,355.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 18, 1967. CAN. 0793224, FRA. 1465811, GRB. 1069351, ITL. 0778708.
3,349,750.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 31, 1967. CAN. 0819050, FRA. 1516053, GRB. 1165377, ITL. 0788953, JAP. 0547202, MEX. 0093862.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,550,556.—DEVELOPMENT APPARATUS. DEC. 29, 1970. ARG. 0180677, AUS. 0442279, BEL. 0726571, BRA. 6905449, CAN. 0882576, CZC. 0157055, EGR. 0076888, FRA. 1604314, GRB. 1252494, ITL. 0854006, JAP. 0731247, MEX. 0109983, PNM. 0001770, RMN. 0054558, SAF. 0069180, SPN. 0362037, STZ. 0498431, SWD. 0351059, USR. 0372851, VZL. 0023724.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,687,270.—CONVEYOR ASSEMBLY. AUG. 29, 1972. CAN. 0952464, GRB. 1376231.
3,717,122.—MAGNETIC GATE. FEB. 20, 1973. CAN. 0960031, GRB. 1377023.
3,943,887.—HYBRID CROSSMIXER. MAR. 16, 1976.
3,947,107.—PARTIALLY SUBMERGED ACTIVE CROSSMIXER. MAR. 30, 1976. BEL. 0835370.
3,973,518.—CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE. AUG. 10, 1976.
3,995,590.—BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS. DEC. 7, 1976.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,040,386.—RETRACTABLE EDGE SEALS FOR ELECTROSTATOGRAPHIC DEVELOPMENT SYSTEMS. AUG. 9, 1977.
4,056,076.—DEVELOPER MIXING SYSTEM. NOV. 1, 1977.

Class 5I 2

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,011,835.—TONER CONVEYOR. MAR. 15, 1977.

Class 5I 2A

2,750,922.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC PLATES. JUNE 19, 1956.
2,965,266.—XEROGRAPHIC TONER DISPENSER. DEC. 20, 1960, GRB. 0881609.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,135,433.—XEROGRAPHIC TONER DISPENSING APPARATUS. JUNE 2, 1964. CAN. 0701240.
3,149,760.—POWDER DISPENSING APPARATUS. SEPT. 22, 1964.
3,250,439.—XEROGRAPHIC TONER DISPENSER. MAY 10, 1966. CAN. 0815453, GRB. 1126197, JAP. 0512654.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,385,500.—TONER PACKAGE. MAY 28, 1968. CAN. 0864337, GRB. 1189147, JAP. 0931680.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.
3,622,054.—TONER DISPENSER IMPROVEMENT. NOV. 23, 1971. CAN. 0911705.
3,722,471.—TONER METER DEVICE. MAR. 27, 1973. CAN. 0951108, GRB. 1370009.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,920,155.—PARTICLE LEVEL INDICATOR. NOV. 18, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,941,470.—A TONER PARTICLE DISPENSER. MAR. 2, 1976.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,954,331.—TONER DISPENSER. MAY 4, 1976.
3,979,022.—MONITORING DEVICE—MAGNETIC POWERED ALARM DEVICE. SEPT. 7, 1976. BEL. 0801607, CAN. 0982841, FRA. 7300103, GRB. 1431574, ITL. 0990693, SWD 7308931.
4,034,701.—PARTICLE DISPENSER0TONER DISPENSER—EPIC. JULY 12, 1977. BEL. 0801243, CAN. 0979209, FRA. 7323735, GRB. 1,438,799, ITL. 0990691, SWD. 7,308,929.

Class 5I 2B

2,974,632.—DEVELOPER OF ELECTROSTATIC PHOTOGRAPHY. MAR. 14, 1961. CAN. 0704147.
3,389,863.—XEROGRAPHIC TONER DISPENSER. JUNE 25, 1968. CAN. 0835862, FRA. 1497062, GRB. 1171303, ITL. 0787552, JAP. 0589523, MEX. 0093821, VZL. 0024004.
3,390,664.—XEROGRAPHIC TONER DISPENSING APPARATUS. JULY 2, 1968. CAN. 0852124, GRB. 1208593, JAP. 0608323.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

Class 5I 2C

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

3,956,108.—ANTI-PLUGGING DEVICE FOR AUTOMATIC DEVELOPABILITY CONTROL SYSTEMS. MAY 11, 1976.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING & RECLAIMING TONER. MAY 25, 1976.
3,974,944.—TONER DISPENSER. AUG. 17, 1976.
4,065,031.—PROGRAMMABLE DEVELOPMENT CONTROL SYSTEM. DEC. 27, 1977.

Class 51 2C 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.
3,013,703.—POWDER DISPENSING APPARATUS. DEC. 19, 1961. CAN. 0677935, GRB. 0938501, JAP. 0300276.
3,300,101.—TONER DISPENSER. JAN. 24, 1967. CAN. 0800856, GRB. 1152671, JAP. 0524530.
3,339,807.—TONER CONTAINER AND DISPENSER. SEPT. 5, 1967. CAN. 0842133, GRB. 1165953, JAP. 0547201.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,538,887.—ELECTROSCOPIC TONER POWDER DISPENSER. NOV. 10, 1970.
3,542,089.—TONER DISPENSER. NOV. 24, 1970. CAN. 0885916.
3,596,807.—DISPENSING APPARATUS—REISSUED D2184R RE27876. AUG. 3, 1971. CAN 0868818.
3,608,792.—APPARATUS FOR DISPENSING FINELY DIVIDED PARTICULATE MATERIAL. SEPT. 28, 1971. ARG. 0182132, ATR. 0311790, AUS. 0456817, BEL. 0745602, CAN. 0869923, CHL. 0025844, DNK. 0128336, FRA. 7003984, GRB. 1302401, GUA. 0002512, ITL. 0886722, MEX. 0119828, NZL. 0159117, PNM. 0002240, SAF. 0700806, SPN. 0376265, STZ. 0526801, SWD. 7001426, TIW. 0005927, VZL. 0032924.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,655,033.—VIBRATORY BOWL—TONER DISPENSER. APR. 11, 1972.
3,752,576.—TRANSPORT FOR PARTICULATE MATERIAL. AUG. 14, 1973.
3,896,279.—TNE LVL DETCTR ASSEMBLY INC MAGNETICLY RESPONSIVE SWITCH ACTUATD BY DFERENTL LOADED BLADE TYPE. JULY 22, 1975.
3,901,187.—DEVELOPER RETONING APPARATUS. AUG. 26, 1975.
3,920,154.—TONER LEVEL DETECTOR. NOV. 18, 1975.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

Class 51 2C 2

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,348,522.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799397, GRB. 1135743, JAP. 0942998, MEX. 0089292.
3,348,523.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799399, GRB. 1139299, JAP. 5371200.
3,376,853.—ELECTROSTATIC TONER CONTROL. APR. 9, 1968. CAN. 0819051, GRB. 1177232, JAP. 0568731.
3,376,854.—AUTOMATIC TONER DISPENSING CONTROL—SEE D2425 FOR RE27480. APR. 9, 1968. ARG. 0164003, ATR. 0279352, AUS. 0416453, BEL. 0699115, CAN. 0866349, CHL. 0022942, CLB. 0016441, CZC. 0160633, DNK. 0116114, EGR. 0067870, EIR. 0031100, FRA. 1524678, GRB. 1186775, GRK. 0033692, IND. 0110760, ISR. 0028022, ITL. 0796438, JAP. 0800113, LXB. 0053713, MEX. 0099990, NOR. 0128039, NZL. 0148850, PAK. 0118694, PLD. 0069794, PLP. 0005554, PRU. 0009348, PTG. 0047758, SAF. 0673111, SPN. 0340983, STZ. 0473409, SWD. 6707266, TRK. 0014624, UAR. 0008620, URG. 0008538, USR. 0494887, VZL. 0023661.
3,430,606.—ELECTROSCOPIC PARTICLE SENSOR. MAR. 4, 1969. BEL. 0726274, BRA. 6805010, CAN. 0891683, FRA. 1597321, ITL. 0866513, MEX. 0107599, PNM. 0001400, USR. 0336895, VZL. 0023727.
3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.
3,526,338.—METHOD AND CONTROLLER FOR DISPENSING ELECTROSCOPIC MATERIAL—AUTOMATIC TONER DISPENSER CONTROL—24. SEPT. 1, 1970. ARG. 0181603, AUS. 0436922, BEL. 0726274, BRA. 6804852, CAN. 0895526, GRB. 1216690, ITL. 0866513, JAP. 0752505, MEX. 0107687, PNM. 0001419, SPN. 0362036, SWD. 0355090, USR. 0336895, VZL. 0023723.
3,527,387.—DEVELOPER REPLENISHING PROGRAMMING SYSTEM. SEPT. 8, 1970. CAN. 0922772, GRB. 1233814, JAP. 0758340.
3,536,042.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 27, 1970.
3,604,939.—TONER SENSING APPARATUS—TONER SENSOR ASSEMBLY-GENIE. SEPT. 14, 1971. CAN. 0915751, GRB. 1260379, JAP. 0752502.
3,635,373.—AUTOMATIC DEVELOPABILITY CONTROL APPARATUS. JAN. 18, 1972. ARG. 0190708, AUS. 0445334, BEL. 0760748, CAN. 0923546, CHL. 0025916, EGR. 0091983, FRA. 7047630, GRB. 1336590, GUA. 0002624, ITL. 0913903, JAP. 0795149, MEX. 0116721, PNM. 0002092, SPN. 0386750, STZ. 0524843, SWD. 0362511, TIW. 0007197.
3,659,556.—PROGRAMMABLE TONER DISPENSER. MAY 2, 1972. BEL. 0771423, CAN. 0936681, FRA. 7130743, GRB. 1358448, ITL. 0934010.
3,692,403.—AUTOMATIC CONTROL OF TONER CONCENTRATIONS. SEPT. 19, 1972. CAN. 0979635, GRB. 1409578.
3,693,581.—TONER DISPENSER CIRCUIT FOR ELECTROSTATOGRAPHIC APPARATUS. SEPT. 26, 1972.
3,727,065.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM. APR. 10, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, FGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.
3,754,821.—AUTOMATIC DEVELOPMENT CONTROL. AUG. 28, 1973. ARG. 0195188, AUS. 0467463, BEL. 0793425, CAN. 1004725, FRA. 7246724, GRB. 1411448, ITL. 0972845, JAP. 0552838, MEX. 0128209, NZL. 0169419, SAF. 7219030, SPN. 0410096, STZ. 0552838, SWD. 7216891, VZL. 0032066.
3,757,999.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM FOR ELECTROSTATIC RECORDING APPARATUS. SEPT. 11, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, EGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.
3,778,146.—ILLUMINATING APPARATUS. DEC. 11, 1973.
3,801,196.—TONER CONCENTRATION REGULATING APPARATUS. APR. 2, 1974.
3,814,516.—HUMIDITY COMPENSATED CONTROL DEVICE. JUNE 4, 1974. CAN. 1012202, GRB. 1458558.
3,825,337.—COLOR BALANCE DISPLAY. JULY 23, 1974. CAN. 1006766.
3,834,806.—PARTICLE LEVEL INDICATOR. SEPT. 10, 1974.
3,872,825.—PARTICLE CONCENTRATION DETECTOR. MAR. 25, 1975. CAN. 1014598.
3,873,002.—TONER DISPENSER LOGIC CONTROL. MAR. 25, 1975. BEL. 0813798, CAN. 1008915, GRB. 1457565, ITL. 1009837.
3,893,408.—TONER DISPENSER SYSTEM. JULY 8, 1975.
3,894,799.—APPARATUS FOR MONITORING COPY QUALITY. JULY 15, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,936,176.—DEVICE FOR MAINTAINING A DEVELOPABILITY REGULATING APPARATUS CONTAMINANT FREE. FEB. 3, 1976.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,969,114.—METHOD FOR MONITORING COPY QUALITY. JULY 13, 1976.
3,999,119.—MEASURING TONER CONCENTRATION. DEC. 21, 1976.
4,026,643.—APP & MTHD FOR MEASUREMENT OF THE RTO OF TNR PRTLCS ELCTRSTATC CHRGE TO TNR PRTLE MASS IN ELCTSTC. MAY 31, 1977.
4,032,225.—COPYING MACHINES. JUNE 28, 1977.
4,043,293.—DEVELOPABILITY REGULATING APPARATUS. AUG. 23, 1977.
4,076,149.—SLAVE DRIVER FOR TONER DISPENSER WITH STRIKER. FEB. 28, 1978.
4,079,266.—ELECTRONIC CONTROL FOR AUTOMATIC DEVELOPABILITY SYSTEM. MAR. 14, 1978.

4,082,445.—TONER CONTROL SYSTEM FOR AN ELECTROSTATIC REPRODUCTION MACHINE. APR. 4, 1978. BEL. 848542.

Class 5J

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.
3,908,037.—IMAGE DEVELOPING TECHNIQUES. SEPT. 23, 1975. CAN. 0980181, GRB. 1406292.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5J 1

2,690,394.—ELECTROPHOTOGRAPHY. SEPT. 28, 1954.
2,777,418.—METHOD AND APPARATUS FOR DEVELOPING AN IMAGE ON A XEROGRAPHIC PLATE. JAN. 15, 1957. CAN. 0587719.
2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.
3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.
3,091,219.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 28, 1963.
3,147,147.—XEROGRAPHIC DEVELOPING APPARATUS AND ELECTRODE. SEPT. 1, 1964. CAN. 0738918, GRB. 1007167.
3,241,466.—ELECTROSTATIC PHOTOGRAPHY. MAR. 22, 1966.
3,424,131.—ELECTRODED CASCADE DEVELOPMENT SYSTEM. JAN. 28, 1969. CAN. 0848084, FRA. 1463050, GER. 1497214, GRB. 1123618, ITL. 0729637, JAP. 0499007.
3,606,863.—DEVELOPMENT ELECTRODE. SEPT. 21, 1971. CAN. 0905099, GRB. 1296756, JAP. 0774497.
3,611,992.—CLEANUP ELECTRODE. OCT. 12, 1971. CAN. 0916431.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,648,658.—DEVELOPING APPARATUS. MAR. 14, 1972.
3,651,784.—LOW POTENTIAL DEVELOPMENT ELECTRODE. MAR. 28, 1972. CAN. 0917900.
3,670,700.—DEVELOPMENT ELECTRODE. JUNE 20, 1972. ARG. 0185528, ATR. 0324836, AUS. 0445848, BEL. 0752935, CAN. 0916430, CHL. 0025837, DNK. 0126729, EGR. 0085926, FRA. 7024671, GRB. 1304065, IND. 0127310, ITL. 0900194, JAP. 0731613, MEX. 0115164, NOR. 0131437, NZL. 0160642, PLP. 0006295, PNM. 0001951, PTG. 0054071, SAF. 0704531, SPN. 0381380, STZ. 0513439, SWD. 0358976, TIW. 0007161, USR. 0503555, VZL. 30684.
3,741,156.—XEROGRAPHIC DEVELOPMENT APPARATUS. JUNE 26, 1973.
3,778,144.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 11, 1973. CAN. 0972550, GRB. 1393144.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.
3,790,397.—RETONING CARRIER BEADS IN THE DEVELOPMENT ZONE. FEB. 5, 1974.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,955,976.—DEVELOPING METHOD IN ELECTROPHOTOGRAPHY-DEVELOPING METHOD IN ELECTROPHOTOGRAPHY. MAY 11, 1976. GRB. 1329143.

Class 5J 2

2,784,694.—SEGMENTED DEVELOPMENT ELECTRODE. MAR. 12, 1957. CAN. 0564484.
3,416,494.—XEROGRAPHIC DEVELOPMENT ELECTRODE. DEC. 17, 1968. CAN. 0882575, GER. 1816690, GRB. 1249664, JAP. 0653014.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.

Class 5J 3

2,952,241.—DEVELOPER ELECTRODE FOR ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 13, 1960.
3,349,676.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. OCT. 31, 1967. CAN. 0814087, FRA. 1473662, GER. 1522685, GRB. 1144766, ITL. 0764006, JAP. 0513609, MEX. 0090133.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

Class 5J 4

2,911,944.—XEROGRAPHIC DEVELOPMENT APPARATUS. NOV. 10, 1959. CAN. 0603099.
2,942,573.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 28, 1960. CAN. 0701146, GRB. 0930072.
3,062,178.—XEROGRAPHIC DEVELOPING APPARATUS. NOV. 6, 1962.
3,105,777.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 1, 1963. CAN. 0700762.

Class 5J 5

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.
2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,611,982.—DEVELOPMENT ELECTRODE CONTROL APPARATUS. OCT. 12, 1971. ARG. 0185532, AUS. 0450067, BEL. 0755383, BRA. 0088402, CAN. 0913353, CHL. 0025834, EGR. 0090283, FRA. 7032350, GRB. 1303148, ITL. 0901777, JAP. 0758461, MEX. 0117918, PLD. 80986, PNM. 0002245, SPN. 0383058, STZ. 0523526, SWD. 0361750, TIW. 0007514, USR. 0473382, VZL. 0032598.
3,696,784.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 10, 1972. BEL. 0776601, CAN. 0951109, FRA. 7146241, GRB. 1369648, ITL. 0943905.
3,719,169.—PLURAL ELECTRODE DEVELOPMENT APPARATUS. MAR. 6, 1973. CAN. 0979299, GRB. 1381910.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,788,739.—IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES. JAN. 29, 1974.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,815,988.—IMAGE DENSITY CONTROL APPARATUS. JUNE 11, 1974. ARG. 0205710, BEL. 0815209, FRA. 7416693, GRB. 1458707, ITL. 1012346, SAF. 0743132.
3,818,864.—IMAGE DEVELOPING APPARATUS. JUNE 25, 1974. CAN. 0980181, GRB. 1406292.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
4,084,538.—AMBIENT TEMPERATURE COMPENSATING DEVICE FOR POWER SOURCE APPARATUS FOR DEVELOPING ELECTRODE. APR. 18, 1978.

Class 5K

2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,212,889.—XEROGRAPHIC CONTRAST CONTROL. OCT. 19, 1965. GRB. 1008897.
3,251,685.—METHOD OF CONTROLLING CONTRAST IN A XEROGRAPHIC REPRODUCTION PROCESS. MAY 17, 1966. CAN. 0707047, GER. 1265583, JAP. 0446813.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.

3,707,947.—CROSS-CHANNEL MIXER. JAN. 2, 1973. ARG. 0200109, ATR. 0322982, AUS. 0457444, BEL. 0776661, CAN. 0946145, CHL. 0027259, DNK. 0132048, EGR. 0099026, FRA. 7145340, GRB. 1372731, ITL. 0943876, MEX. 0127352, PNM. 0002585, SAF. 0718308, SPN. 0397852, STZ. 0557554, TIW. 0005832, USR. 0402245.

3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.

3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. CAN. 0991246, GRB. 1406794.

3,865,080.—TONER PICKOFF APPARATUS. FEB. 11, 1975. GRB. 1430876.

3,865,612.—XEROGRAPHIC DEVELOPMENT METHOD. FEB. 11, 1975.

3,887,367.—METHOD FOR TEMPERATURE STABILIZING PHOTORECEPTORS. JUNE 3, 1975.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

3,893,413.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.

3,911,865.—TONER PICKOFF APPARATUS. OCT. 14, 1975.

3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

3,994,725.—MEANS FOR ENHANCING REMOVAL OF BACKGROUND TONER PARTICLE. NOV. 30, 1976.

3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.

4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 5L

2,901,374.—DEVELOPMENT OF ELECTROSTATIC IMAGE AND APPARATUS THEREFOR. AUG. 25, 1959. CAN. 0565027.

3,245,823.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. APR. 12, 1966.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

Class 5M

2,817,598.—CONTINUOUS TONE REVERSAL DEVELOPMENT PROCESS. DEC. 24, 1957. CAN. 0574108, FRA. 1146729, GER. 1026620, GRB. 0813915, JAP. 0247824.

3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.

3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.

3,877,963.—REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING. APR. 15, 1975.

3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.

3,901,698.—METHOD OF REVERSAL DEVELOPMENT USING TWO ELECTROSTATIC DEVELOPERS. AUG. 26, 1975.

Class 5N

2,822,779.—DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY. FEB. 11, 1958. CAN. 0560056.

3,907,693.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY. SEPT. 23, 1975.

3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.

3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.

3,963,486.—ELECTROPHOTOGRAPHIC IMAGING PROCESS EMPLOYING EPOXY-ESTER CONTAINING LIQUID DEVELOPER. JUNE 15, 1976.

4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.

4,047,943.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH CONDUCTIVE LIQUID DEVELOPER. SEPT. 13, 1977.

4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.

4,076,640.—PREPARATION OF SPHEROIDIZED PARTICLES. FEB. 28, 1978. SPN. 445496.

4,077,804.—METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS. MAR. 7, 1978.

Class 5N 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.

2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065. JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 2131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 5N 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 003270B, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062, PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, AUS. 0480033, BAH. 0000093, BEL. 0716083, BOL. 3399B, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065, JAM.

0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,948,654.—ELECTROSTATOGRAPHIC PROCESS. APR. 6, 1976.

3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. SEPT. 28, 1976. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.

4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.

4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.

4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES.

Class 5N 2

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.

2,618,552.—DEVELOPMENT OF ELECTROPHOTOGRAPHIC IMAGES. NOV. 18, 1952.

2,638,416.—DEVELOPER COMPOSITION FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAY 12, 1953. AUS. 0149163, BEL. 0488778, CAN. 0507733, FRA. 0985322, GER. 0833608, GRB. 0679715, HOL. 0084987, ITL. 0453731, JAP. 0191247, SAF. 0007764, STZ. 0286147, SWD. 0150223.

3,844,815.—FORON YELLOW AS A TONER COLORANT. OCT. 29, 1974. BEL. 808754, CAN. 1003264, FRA. 7345058, ITL. 1000870.

4,078,930.—DEVELOPER COMPOSITIONS COMPRISING TONER AND CARRIER. MAR. 14, 1978. FRA. 763634.

Class 5N 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TOWER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,013,572.—HYBRID FIX SYSTEM INCORPORATING PHOTOGRADABLE POLYMERS. MAR. 22, 1977.

4,049,447.—IMAGING SYSTEM. SEPT. 20, 1977. ARG. 195092, AUS. 468938, BEL 791376, CAN. 986768, FRA 7239133, GRB. 1411446, ITL. 972536, MEX. 131270, SPN. 409973, STZ. 28528, VZL. 33138.

Class 5N 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

2,788,288.—RHEINFRANK JJ JONES WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.

2,940,934.—ELECTROSTATIC DEVELOPER COMPOSITION & METHOD THEREFOR—SEE D670 FOR RE25136. JUNE 14, 1960.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2A 2

2,659,670.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. NOV. 17, 1953.

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710, LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX ESPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR.

0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATEN IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825 MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

4,065,305.—XEROGRAPHIC DEVELOPER. DEC. 27, 1977.

Class 5N 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 5N 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,833,366.—CARRIER COMPOSITIONS. SEPT. 3, 1974. BEL. 0748633, CAN. 0904641, FRA. 7012584, GRB. 1319787, ITL. 0899337, JAP. 0709043.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIERS PARTICLES. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,929,657.—STOICHIOMETRIC FERRITE CARRIERS. DEC. 30, 1975. BEL. 0819535.

3,945,823.—ELECTROSTATOGRAPHIC REVERSAL DEVELOPMENT WITH DEVELOPER COMPRISING POLY(P-XYLYLENE) COATED CARR. MAR. 23, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,947,371.—DEVELOPER MATERIAL WITH POLYPXYLYLENE-COATED CARRIER. MAR. 30, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

3,996,392.—HUMIDITY-INSENSIVE FERRITE DEVELOPER MATERIALS. DEC. 7, 1976. BEL. 0847571.

4,007,293.—MECHANICALLY VIABLE DEVELOPER MATERIALS. FEB. 8, 1977.

4.019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977.

4,039,331.—CARRIER BEAD COATING COMPOSITIONS. AUG. 2, 1977.

4,040,969.—HIGH SURFACE AREA CARRIER. AUG. 9, 1977. BEL. 829639, GRB. 1497732, SPN. 438084.

4,042,517.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER. AUG. 16, 1977.

4,042,518.—STOICHIOMETRIC FERRITE CARRIERS. AUG. 16, 1977. BEL. 819535, CAN. 1033978, FRA. 7429829, GRB. 1468841, SPN. 429670.

4,043,929.—ELECTROSTATOGRAPHIC CARRIER COMPOSITION. AUG. 23, 1977.

4,053,310.—DURABLE CARRIER COATING COMPOSITIONS COMPRISING POLYSULFONE. OCT. 11, 1978.

4,057,426.—MAGNETIC TONER WITH A COATED CARRIER. NOV. 8, 1977.

4,058,397.—YELLOW DEVELOPER EMPLOYING A COATED CARRIER. NOV. 15, 1978.

4,065,585.—RENEWABLE CHOW FUSER COATING. DEC. 27, 1977. GRB. 1490252.

4,066,563.—COPPER-TETRA-4-(OCTADECYLSULFONOMIDO) PHTHALOCYANINE ELECTROPHOTOGRAPHIC CARRIER. JAN. 3, 1978.

4,073,965.—YELLOW DEVELOPER EMPLOYING A COATED CARRIER AND IMAGING PROCESS USING SAME. FEB. 14, 1978.

4,076,893.—TRIBO MODIFIED CARRIER MATERIALS VIA ACYLATION. FEB. 28, 1978.

4,078,926.—IMAGING METHOD UTILIZING FUNCTIONALIZED CARRIER MATERIALS. MAR. 14, 1978.

4,079,166.—AMINOLYZED CARRIER COATINGS. MAR. 14, 1978.

4,092,163.—IMAGING PROCESS UTILIZING SILYLATED COATED CARRIER. MAY 30, 1978.

4,094,803.—DEVELOPER COMPOSITION COMPRISING AMINOLYZED COATED CARRIER. JUNE 13, 1978.

Class 5N 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

4,027,048.—ELECTROSTRATOGRAPHIC DEVELOPMENT. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,049,447.—IMAGING SYSTEM. SEPT. 20, 1977. ARG. 195092, AUS. 468938, BEL. 791376, CAN. 986768, FRA. 7239133, GRB. 1411446, ITL. 972536, MEX. 131270, SPN. 409973, STZ. 28528, VZL. 33138.

4,070,186.—TRIBO MODIFIED TONER MATERIALS VIA SILYLATION AND ELECTROSTATOGRAPHIC IMAGING PROCESS. JAN. 24, 1978.

4,070,296.—TRIBOELECTRICALLY CONTROLLED COVALENTLY DYED TONER MATERIALS. JAN. 24, 1978.

4,078,931.—AMINOLYZED TONER COMPOSITIONS AND IMAGING PROCESS USING SAME. MAR. 14, 1978.

4,079,166.—AMINOLYZED CARRIER COATINGS. MAR. 14, 1978.

Class 5N 5A

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.

3,804,619.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS. APR. 16, 1974. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.

3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TONER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.

4,035,310.—YELLOW DEVELOPER. JULY 12, 1977.

4,052,207.—ELECTROSTATOGRAPHIC IMAGING PROCESS. OCT. 4, 1977. SPN. 450203.

Class 5N 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.

3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 5N 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.

3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.

3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5N 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.

3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.

3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.

3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.

3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.

3,989,435.—APPARATUS FOR FABRICATING SPHERICALLY SHAPED PARTICLES OF SMALL DIAMETER. NOV. 2, 1976.

4,019,842.—APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS. APR. 26, 1977.

4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.

4,076,640.—PREPARATION OF SPHEROIDIZED PARTICLES. FEB. 28, 1978. SPN. 445496.

Class 5N 6B

2,862,889.—DEAGGLOMERATOR. DEC. 2, 1958.

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260, FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.

3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.

3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.

3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.

3,830,750.—ENCPSLING SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.

3,893,933.—PROCESS FOR PRODUCING ENCAPSULATED TONER COMPOSITION. JULY 8, 1975.

3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.

3,990,797.—DIFFRACTION MONITORING OF RAYLEIGH MODE JETS. NOV. 9, 1976.

4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.

4,097,404.—PROCESS FOR PROVIDING ENCAPSULATED TONER COMPOSITION-MICROENCAPSULATION. JUNE 27, 1978.

Class 5O

3,641,981.—APPARATUS FOR CONTROLLING DEVELOPER CHARGE LEVEL. FEB. 15, 1972. CAN. 0914006, GRB. 1338417.

3,654,901.—TONER RECLAIMING SYSTEM. APR. 11, 1972. ATR. 0321720, AUS. 0459286, BEL. 0754425, CAN. 0941881, DNK. 0130262, EGR. 0085711, FRA. 7029147, GRB. 1325455, IND. 0127847, ITL. 0901160, JAP. 1143014, NOR. 0130609, PLD. 0080951, PLP. 0008671, PTG. 0054272, SAF. 0705408, SPN. 0382437, STZ. 0513441, SWD. 0361533, TIW. 0006725, USR. 0373974.

3,664,297.—CENTRIFUGAL DEVELOPMENT APPARATUS AND METHOD. MAY 23, 1972. GRB. 1315565, JAP. 0719144.

3,809,012.—DEVELOPER SEAL. MAY 7, 1974. CAN. 0984133.

3,872,826.—DEVELOPMENT SYSTEM SEAL. MAR. 25, 1975.

3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.

3,906,899.—DEVELOPER SEAL. SEPT. 23, 1975.

3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.

3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.

3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.

4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

4,039,102.—DEVELOPER DOOR WITH USE COUNTER ON DOOR. AUG. 2, 1977.

4,041,902.—FILTER APPARATUS. AUG. 16, 1977.

4,058,086.—EMISSION CONTROLLER FOR DEVELOPMENT APPARATUS. NOV. 15, 1977.

4,088,481.—EXTENDED RANGE COLOR ELECTROPHOTOGRAPHIC METHOD BY SUPERIMPOSING A HALF-TONE IMAGE ON A LOW. MAY 9, 1978.

4,100,611.—APPARATUS FOR CONTROLLING AIRBORNE PARTICLE EMISSION. JULY 11, 1978.

Class 5P

3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944519, GRB. 1296997, ITL. 0882670, USR. 0358873.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 6

3,753,560.—AUXILIARY SHEET FEEDER-MULTI STATION AUXILIARY PAPER FEEDER-2400. AUG. 21, 1973. AUS. 0466179, BEL. 0793641, CAN. 1000750, FRA. 7300150, GRB. 1402971, ITL. 0973328, SPN. 0410322.
3,833,790.—HEATED PRESSURE FUSING SYSTEM. SEPT. 3, 1974, FRA. 7422884.

Class 6A

3,104,873.—PAPER SUPPLY TRAY. SEPT. 24, 1963. CAN. 0699129, GRB. 1016553.
3,153,534.—PAPER SUPPLY TRAY. OCT. 20, 1964.
3,154,356.—PAPER CATCH TRAY. OCT. 27, 1964. CAN. 0726574, GRB. 1032952, JAP. 0497185.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,406,964.—ADJUSTABLE PACK HOLDER. OCT. 22, 1968. CAN. 0848822, GER. 1270049, GRB. 1158671, JAP. 0914623.
3,415,510.—AUXILIARY SHEET FEEDER. DEC. 10, 1968. CAN. 0831412, GRB. 1235158.
3,458,187.—SHEET HOLDER. JULY 29, 1969. CAN. 0879560, GRB. 1199947.
3,599,966.—SHEET HANDLING APPARATUS. AUG. 17, 1971. CAN. 0921504, JAP. 783765.
3,601,394.—SHEET RETAINING APPARATUS. AUG. 24, 1971. ARG. 0195162, AUS. 0437722, BEL. 0752940, CAN. 0966521, CHL. 0026165, CZC. 0164276, EGR. 0085710, FRA. 7024668, GRB. 1312304, ITL. 0900198, JAP. 0803409, MEX. 0116509, PLD. 0082760, PNM. 0002170, SPN. 0381385, STZ. 0547747, SWD. 0361648, TIW. 0005745, USR. 0493985.
3,651,933.—COPY SHEET PACKAGE. MAR. 28, 1972.
3,687,448.—SHEET FEEDING APPARATUS. AUG. 29, 1972. CAN. 9782161, GRB. 1373810.
3,847,385.—SHEET CONTAINER. NOV. 12, 1974. CAN. 0991208.
3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,848,988.—MOISTURE CONTROL DEVICE. NOV. 19, 1974.
3,857,558.—PAPER CASSETTE DESIGN WITH IRREGULAR BOTTOM. DEC. 31, 1974, CAN. 1010083.
3,883,133.—MOVABLE PACK ADVANCER. MAY 13, 1975.
3,907,283.—SENSING SHEETS ON A SUPPORT SURFACE. SEPT. 23, 1975.
3,921,972.—SHEET STACK RECEPTACLE. NOV. 25, 1975.
3,926,519.—CONTROL DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,934,870.—SHEET FEEDING DEVICES. JAN. 27, 1976.
3,936,044.—ADJUSTABLE SHEET GUIDE. FEB. 3, 1976.
3,957,366.—SHEET FEEDING APPARATUS. MAY 18, 1976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,008,957.—REPRODUCTION MACHINE CONTROL. FEB. 22, 1977.
4,014,537.—AIR FLOATATION BOTTOM FEEDER. MAR. 29, 1977.
4,060,233.—CASSETTE LOADED SHEET FEEDER FOR REPRODUCTION MACHINE. NOV. 29, 1977.
4,060,234.—CARTRIDGE TRAY FOR USE IN A COPYING MACHINE. NOV. 29, 1977.
4,075,391.—PRODUCTION OF FERRITE ELECTROSTATOGRAPHIC CARRIER MATERIAL HAVING IMPROVED PROPERTIES. FEB. 21, 1978. BEL. 847571, FRA. 7632899, SPN. 452858.
4,086,007.—DUAL PURPOSE DOCUMENT AND COPY SHEET FEED CASSETTE. APR. 25, 1978.

Class 6A 1

3,100,111.—SHEET FEED MECHANISM. AUG. 6, 1963. ARG. 0162642, CAN. 0683564, GRB. 1032956, IND. 0096309, JAP. 0478677.
3,301,551.—SHEET FEED MECHANISM. JAN. 31, 1967. CAN. 0811029, JAP. 0639312.
3,378,254.—PACK ADVANCER. APR. 16, 1968. CAN. 0815409, GER. 1289850, GRB. 1129872, JAP. 0615872.
3,402,928.—SHEET HANDLING APPARATUS. SEPT. 24, 1968. CAN. 0871575, GRB. 1203615, JAP. 0602168.
3,558,127.—SHEET HANDLING APPARATUS. JAN. 26, 1971. ARG. 0180315, AUS. 0443480, BEL. 0741889, CAN. 0928826, FRA. 6939710, GRB. 1282910, ITL. 0878226, JAP. 0791733, MEX. 0112773, SPN. 0373541, SWD. 6915742.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,768,806.—BI-DIRECTIONALLY MOVABLE PLATFORM CONTROL. OCT. 30, 1973. CAN. 0992113, GRB. 1403040.
3,820,777.—ELEVATOR ASSEMBLY POSITIONING CONTROL. JUNE 28, 1974. BEL. 0802196, CAN. 0999334, GRB. 1416470.
3,898,425.—FUSING APPARATUS. AUG. 5, 1975.
4,004,127.—IMPROVED ON LINE FUSING SYSTEM. JAN. 18, 1977.
4,033,578.—STACK ELEVATING APPARATUS. MAY 7, 1977.

Class 6B

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,958,989.—TRANSPARENCY SUPPORT MATERIAL FOR ELECTROPHOTOGRAPHIC PROCESS. MAY 25, 1976. BEL. 0815634, CAN. 1006012.
4,043,549.—IMPACT FEEDER. AUG. 23, 1977.
4,051,285.—TEARABLE EDGE STRIP FOR PLASTIC SHEET. SEPT. 27, 1977. BEL. 815634, CAN. 1006012, FRA. 7419536, ITL. 1014700.

Class 6B 1

2,945,434.—SHEET FEED MECHANISM. JULY 19, 1960. CAN. 0693829.
3,062,533.—PAPER FEED APPARATUS. NOV. 6, 1962. CAN. 0712936.
3,062,534.—SHEET FEED MECHANISM. NOV. 6, 1962. GRB. 1016700.
3,083,962.—SHEET STRIPPER. APR. 2, 1963. ARG. 0165468, CAN. 0712935, GRB. 1032958, IND. 0096311, JAP. 0484728.
3,104,872.—EDGE DRAG DEVICE. SEPT. 24, 1963. CAN. 0699594.
3,241,830.—SHEET FEED MECHANISM. MAR. 22, 1966. ATR. 0276087, AUS. 0295720, CAN. 0765301, DNK. 0126493, EIR. 0028650, GER. 1197326, GRB. 1089538, ISR. 0030228, NZL. 0148732, STZ. 0457511.
3,251,594.—SHEET FEED MECHANISM. MAY 17, 1966. AUS. 0416589, CAN. 0785164, DNK. 131.557, EIR. 0029758, GRB. 1122623, ISR. 0034134, JAP. 0499006, NOR. 0125806, SWD. 0358480.
3,276,770.—SHEET FEEDING APPARATUS. OCT. 4, 1966. CAN. 0788346, FRA. 1459041, GER. 1237587, GRB. 1055215, ITL. 0726800, JAP. 0537118.
3,288,460.—PAPER FEED MECHANISM. NOV. 29, 1966. ATR. 0300566, CAN. 0792617, GRB. 1135746, JAP. 0630911, STZ. 0509924.
3,288,461.—SHEET FEEDING APPARATUS. NOV. 29, 1966. CAN. 0856098, GER. 1249887, GRB. 1123260, JAP. 0562385.
3,300,206.—ELECTRICALLY ENERGIZED CLUTCH FOR SHEET FEED CONTROL MECHANISM. JAN. 24, 1967. CAN. 0788344, GRB. 1135745, MEX. 0112221, STZ. 0513063.
3,406,960.—PAPER HANDLING APPARATUS. OCT. 22, 1968. CAN. 0907683, GRB. 1202218.
3,425,685.—PAPER FEED MECHANISM. FEB. 4, 1969. BEL. 0708498, CAN. 0847744, FRA. 1552327, GRB. 1165279, ITL. 0819625, JAP. 0972609, MEX. 0105134.
3,469,834.—SHEET FEEDER AND SEPARATOR APPARATUS. SEPT. 30, 1969. ARG. 0168907, CAN. 0847743, CHL. 0023614, CLB. 0017683, JAM. 0001852, MEX. 0102646, PRU. 0009339, URG. 0008981, VZL. 0023673.
3,524,639.—AUTOMATIC F .EDING DEVICE. AUG. 18, 1970. CAN. 0895184, FRA. 6906418, GRB. 1254784, ITL. 0875431, JAP. 0713806.
3,537,703.—MANIFOLD SHEET SEPARATING DEVICE. NOV. 3, 1970. CAN. 0923351, GRB. 1261077.
3,556,516.—SELF-ALIGNING FEED ROLLER. JAN. 19, 1971. CAN. 0899392, GRB. 1256265.
3,565,421.—FEEDING SYSTEM. FEB. 23, 1971.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193,

HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.

3,578,317.—SHEET CONVEYOR APPARATUS FOR AUTOMATIC COPYING MACHINE. MAY 11, 1971. ARG. 0193800, ATR. 0307233, AUS. 0446229, BEL. 0750390, CAN. 0907682, EGR. 0082423, FRA. 7017317, GRB. 1284832, ITL. 0893096, JAP. 783766, MEX. 0117916, NZL. 0160102, SPN. 0379652, STZ. 0516404, SWD. 0361952, TIW. 0006833, VZL. 0025781.

3,580,565.—SHEET FEEDING APPARATUS. MAY 25, 1971.

3,592,462.—GATED PAPER SNUBBER. JULY 13, 1971. CAN. 0923922.

3,601,389.—SHEET FEEDING APPARATUS. AUG. 24, 1971. ARG. 0184657, BEL. 0752939, CAN. 0912055, CHL. 0026164, FRA. 7024666, GRB. 1306595, GUA. 0002508, ITL. 0907152, MEX. 0114977, PNM. 0002212, TIW. 0006720, VZL. 0032784.

3,618,752.—STACK OF IMAGE RECEIVING MEMBERS. NOV. 9, 1971.

3,655,183.—SHEET FEED APPARATUS. APR. 11, 1972.

3,664,663.—PAPER CASSETTE LOADING DEVICE. MAY 23, 1972. CAN. 0951342, GRB. 1351766.

3,713,645.—SHEET SEPARATING APPARATUS. JAN. 30, 1973. CAN. 0957392.

3,727,910.—SHEET SEPARATOR APPARATUS. APR. 17, 1973. CAN. 0956660, GRB. 1391198.

3,731,915.—FEED ROLL ABRASION ROLLER. MAY 8, 1973. ARG. 0194272, BEL. 0791064, CAN. 0966518, FRA. 7239549, GRB. 1389426, ITL. 0970223.

3,768,803.—SHEET FEEDER. OCT. 30, 1973. ARG. 0197314, BEL. 0795206, CAN. 0966158, FRA. 7304740, GRB. 1413541, ITL. 0978938, MEX. 0130347, SPN. 0411475, STZ. 5656860, SWD. 7301809, VZL. 0033780.

3,773,316.—SHEET FEEDER DRIVE MECHANISM. NOV. 20, 1973. CAN. 0994376, GRB. 1424580.

3,861,670.—SHEET FEEDING APPARATUS. JAN. 21, 1975. CAN. 1010080, GRB. 1435762.

3,866,901.—REVERSE BUCKLE FEEDER. FEB. 18, 1975, CAN. 1008893.

3,873,084.—PAPER FEEDER. MAR. 25, 1975.

3,893,663.—REVERSE BUCKLE SHEET FEEDING APPARATUS. JULY 8, 1975, CAN. 1005090, GRB. 1447909, MEX. 0135280.

3,895,791.—BOTTOM SHEET FEEDER USING SEPARATION BELT AND RETARD PAD. JULY 22, 1975, CAN. 1007255, GRB. 1443089.

3,934,869.—SHEET SEPARATING AND FEEDING APPARATUS. JAN. 27, 1976. GER. 7439833.

3,936,046.—FRONT AND SIDE SHEET REGISTERING APPARATUS. FEB. 3, 1976.

3,941,373.—FLOATING GATE SHEET SEPARATOR. MAR. 2, 1976.

3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.

3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.

3,966,189.—TOGGLING RETARD PAD. JUNE 29, 1976.

3,995,952.—SHEET FEEDING APPARATUS. DEC. 7, 1976.

4,023,792.—SHEET FEEDING APPARATUS. MAY 17, 1977. ARG. 0195877, AUS. 0462397, BEL. 0792370, CAN. 0978556, FRA. 7239132, GRB. 1410799, ITL. 0990513, MEX. 0128127, SPN. 0437744, STZ. 0546689.

4,030,725.—PAPER TRAY FOR COPYING MACHINES. JUNE 21, 1977.

4,043,549.—IMPACT FEEDER. AUG. 23, 1977.

4,053,152.—SHEET FEEDING DEVICE. OCT. 11, 1977.

4,058,305.—PAPER FEEDING DEVICE. NOV. 15, 1977.

Class 6B 2

3,378,255.—PAPER HANDLING APPARATUS. APR. 16, 1968. CAN. 0836939, FRA. 1527333, GRB. 1181271, ITL. 0804517, JAP. 1052342, MEX. 0099951.

3,547,431.—PNEUMATIC CUT SHEET FEEDER. DEC. 15, 1970.

4,043,549.—IMPACT FEEDER. AUG. 23, 1977.

Class 6C

3,120,446.—METHOD OF TRANSFERRING A DEVELOPED SOLID PARTICULATE IMAGE. FEB. 4, 1964.

3,519,124.—ARTICLE TO FACILITATE FEEDING OF IMAGE RECEIVING SHEETS. JULY 7, 1970. CAN. 0941879, FRA. 1568821, GRB. 1216347, ITL. 0870563.

3,589,809.—FEEDING SYSTEM. JUNE 29, 1971.

3,630,514.—SHEET FEEDING APPARATUS. DEC. 28, 1971. ARG. 0186214, AUS. 0452075, BEL. 0751309, CAN. 0921948, EGR. 0090063, FRA. 7019460, GRB. 1253503, ITL. 0893690, JAP. 783764, MEX. 0117507, SPN. 0380270, STZ. 0511759, SWD. 0363621, TIW. 0006836, USR. 0466680.

3,645,615.—COPYING APPARATUS. FEB. 29, 1972. ARG. 0185529, AUS. 0445849, BEL. 0752941, CAN. 0925927, CHL. 0025888, FRA. 7024670, GRB. 1312305, GUA. 0002324, ITL. 0900200, MEX. 0115165, PNM. 0002260, SPN. 0381387, STZ. 0525778, SWD. 7009063, TIW. 0007163, USR. 0535033, VZL. 0032783.

3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.

Class 6D

2,065,383.—PHOTOCOPY MACHINE. DEC. 22, 1936.

2,265,975.—PHOTO-COPY MACHINE. DEC. 9, 1941.

2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.

2,781,705.—PAPER HANDLING MECHANISM FOR XEROGRAPHIC COPYING MACHINE. FEB. 19, 1957. CAN. 0547484.

2,871,819.—XEROGRAPHIC REGISTRATION GUIDE. FEB. 3, 1959.

3,062,538.—SHEET FEEDING APPARATUS. NOV. 6, 1962. CAN. 0701742.

3,071,370.—SHEET FEEDING APPARATUS. JAN. 1, 1963. CAN. 0683900, GRB. 0999435.

3,071,374.—PAPER GRIPPER MECHANISM. JAN. 1, 1963.

3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.

3,095,194.—SHEET GUIDING APPARATUS. JUNE 25, 1963. CAN. 0713451, FRA. 1355072, GER. 1174334, GRB. 1026214, ITL. 0688494, JAP. 0457839.

3,100,109.—PAPER GRIPPER MECHANISM. AUG. 6, 1963. GRB. 1015634, JAP. 0471314.

3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.

3,137,495.—SHEET FEED MECHANISM. JUNE 16, 1964. GRB. 1015636, JAP. 0471315.

3,179,407.—SHEET FEED GUIDE. APR. 20, 1965. CAN. 0719606, FRA. 1355071, GER. 1179562, GRB. 1023036, ITL. 0688495, JAP. 0457550.

3,190,643.—SHEET GUIDING APPARATUS. JUNE 22, 1965.

3,199,866.—SHEET FEED MECHANISM. AUG. 10, 1965. CAN. 0742591, GRB. 1043646.

3,206,193.—XEROGRAPHIC REPRODUCING MACHINE CONTROL. SEPT. 14, 1965.

3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.

3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.

3,245,311.—DOCUMENT CONVEYOR. APR. 12, 1966.

3,256,009.—SHEET REGISTRATION DEVICE. JUNE 14, 1966. CAN. 0777667.

3,281,144.—SHEET REGISTRATION DEVICE. OCT. 25, 1966. ARG. 0152212, AUS. 0423243, CAN. 0803888, DNK. 0122597, EIR. 0029757, GRB. 1122621, ISR. 0034133, JAP. 0512650, MEX. 0078899, NOR. 0126565, SWD. 0358034.

3,357,347.—PAPER FEEDING AND BREAKING MEANS FOR ELECTROGRAPHIC DEVICE. DEC. 12, 1967. CAN. 0863520, GRB. 1182684, JAP. 0582500.

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.

3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.

3,389,907.—DOCUMENT HANDLING APPARATUS. JUNE 25, 1968.

3,411,771.—SHEET TRANSPORT. NOV. 19, 1968. ARG. 0177552, ATR. 0284168, AUS. 0455833, CAN. 0869421, CHL. 0023101, CLB. 0016775, DNK. 0126100, EIR. 0031308, FIN. 0047867, GRB. 1193515, IND. 0112002, ISR. 0028520, JAP. 0604153, MEX. 0099909, NOR. 0127531, NZL. 0149790, PAK. 0119259, PLP. 0005199, PRU. 0009331, SAF. 0674988, SPN. 0344351, STZ. 0478048, SWD. 0343829, TRK. 0015345, URG. 0008858, VZL. 0026277.

3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.

3,434,710.—SHEET HANDLING APPARATUS. MAR. 25, 1969. ARG. 0166613, CAN. 0830328, CHL. 0023568, CLB. 0017530, DNK. 0120163, GRB. 1206965, MEX. 0100814, PRU. 0009338, SPN. 0360895, STZ. 0502942. URG. 0008977, USR. 0433696, VZL. 0023674.

3,502,325.—CARD HANDLING APPARATUS. MAR. 24, 1970. ARG. 0168398, CAN. 0850515, CHL. 0024133, JAM. 0001890, MEX. 0105082, PRU. 0009337, URG. 0009016, VZL. 0027509.

3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,517,923.—SHEET REGISTRATION APPARATUS. JUNE 30, 1970.
3,518,739.—TRACKING ROLLER. JULY 7, 1970. ARG. 0177437, AUS. 0437287, BEL. 0733662, BRA. 6908481, CAN. 0884215, FRA. 6917189, GRB. 1206750, ITL. 0865847, JAP. 0677424, MEX. 0111433, SPN. 0367807, SWD. 0356022, VZL. 0025065.
3,521,060.—METHOD FOR DETECTING MISROUTING OF TRANSPARENCIES DURING PROCESS OF IMAGING THEREON. JULY 21, 1970.
3,531,109.—SHEET MATERIAL TRANSPORT SYSTEM. SEPT. 29, 1970. ARG. 0177190, ATR. 0288161, AUS. 0446394, BEL. 0733197, CAN. 0899923, DNK. 0122717, FRA. 6916409, GER. 1925039, GRB. 1269100, ITL. 0863848, JAP. 0656986, MEX. 0110288, PNM. 0001431, SAF. 0693497, SPN. 0367408, SWD. 0355870.
3,536,320.—SHEET REGISTRATION DEVICE. OCT. 27, 1970.
3,556,511.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. ARG. 0185791, BEL. 0741891, CAN. 0905439, FRA. 6939711, GER. 1957780, GRB. 1279129, HOL. 0144227, ITL. 0878272, JAP. 0854601, MEX. 0112825.
3,556,512.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905438, SWD. 6915838.
3,556,513.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905437.
3,601,392.—SHEET REGISTERING APPARATUS. AUG. 24, 1971. ARG. 0190238, AUS. 0446147, BEL. 0752933, CAN. 0923512, CHL. 0025789, EGR. 0084327, FRA. 7024672, GRB. 1262444, ITL. 0900199, JAP. 0803410, MEX. 0115310, PLD. 0002183, PNM. 0002050, SPN. 0381386, STZ. 0525780, SWD. 0356375, TIW. 0007194, USR. 0406343.
3,603,680.—ULTRASONIC PAPER DETACTION. SEPT. 7, 1971. CAN. 0915715, GRB. 1331457.
3,614,221.—IMAGING SYSTEM. OCT. 19, 1971. CAN. 0930540, GRB. 1343603, JAP. 0728865.
3,622,238.—COPIER MACHINE FEEDING MULTIPLE SIZE COPY SHEETS. NOV. 23, 1971. ARG. 0194337, AUS. 0451241, CAN. 0902127, JAP. 0512383, NZL. 0160105.
3,647,207.—SHEET FEEDING MECHANISM CENTERING DEVICE. MAR. 7, 1972. CAN. 0959934, GRB. 1351765.
3,694,712.—SPEED CONTROL APPARATUS. SEPT. 26, 1972. CAN. 0976641, GRB. 1339506.
3,796,486.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. MAR. 12, 1974.
3,804,516.—FIRE DETECTING DEVICE FOR A PHOTOGRAPHIC PRINTING MACHINE. APR. 16, 1974.
3,809,475.—COPIER FUSER PROTECTOR. MAY 7, 1974. FRA. 7343567.
3,815,380.—SHAFT COUPLING APPARATUS. JUNE 11, 1974, CAN. 0994121.
3,819,266.—COPIER JAM PROTECTION. JUNE 25, 1974, CAN. 1005510.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974, CAN. 0999316.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975, CAN. 1004240.
3,876,317.—LATCH MECHANISM. APR. 8, 1975, CAN. 1005486.
3,888,579.—DIGITAL CONTROLLED DOCUMENT FEEDER. JUNE 10, 1975.
3,893,662.—SHEET FEEDING DEVICE. JULY 8, 1975.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.
3,934,182.—SYNCHRONIZING APPARATUS. JAN. 20, 1976. CAN. 0957735, GRB. 1372568.
3,936,042.—SHEET FEEDING DEVICES. FEB. 3, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
3,948,511.—SHEET FEEDING DEVICES. APR. 6, 1976.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976
3,963,339.—SHEET FEEDING APPARATUS. JUNE 15, 1976.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
4,003,568.—FLUID CONVEYER. JAN. 18, 1977.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.
4,036,421.—WEIGHTED PINCH ROLLS. JULY 19, 1977.
4,055,340.—ASSISTED PNEUMATIC TRANSPORT AND REGISTRATION APPARATUS. OCT. 25, 1977. BEL. 848823.
4,073,001.—APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET. FEB. 7, 1978.
4,077,519.—CURL DETECTOR AND SEPARATOR. MAR. 7, 1978.
4,090,704.—REGISTRATION STATION. MAY 23, 1978.
4,092,021.—UNFUSED IMAGE TRANSPORT. MAY 30, 1978.

Class 6D 1

RE.29,124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
2,444,170.—PHOTOGRAPHIC PRINT CONVEYING MECHANISM. JUNE 29, 1948.
2,446,246.—PHOTOCOPY MACHINE. AUG. 3, 1948.
2,547,979.—PHOTOCOPY MACHINE. APR. 10, 1951.
3,148,878.—SHEET FEED MECHANISM. SEPT. 15, 1964. CAN. 0715431, GER. 1222083, GRB. 1020933, JAP. 0481251.
3,240,486.—PAPER TRANSPORT MECHANISM. MAR. 15, 1966. CAN. 0766647.
3,275,318.—SHEET CONVEYING APPARATUS. SEPT. 27, 1966. MEX. 0085657.
3,408,633.—HIGH SPEED PRINTER SYSTEM. OCT. 29, 1968.
3,482,676.—DOCUMENT FEED BELT. DEC. 9, 1969. CAN. 0890297, GRB. 1253415.
3,642,362.—APPARATUS FOR CONVEYING SHEET MATERIAL. FEB. 15, 1972. GRB. 1307117.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,743,403.—TRANSPORT ASSEMBLY. JULY 3, 1973. CAN. 0983305, GRB. 1417018.
3,781,004.—CONVEYING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. DEC. 25, 1973. CAN. 1007287.
3,790,270.—REGISTRATION RESET SYSTEM. FEB. 5, 1974. GRB. 1439772, ITL. 0993064, SPN. 0418253.
3,804,507.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. APR. 16, 1974.
3,808,658.—SNAP ROLLER. MAY 7, 1974, CAN. 1000637.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974, CAN. 1001104.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,854,566.—PHOTOELECTRIC TABULATING APPARATUS. DEC. 17, 1974. BEL. 0815420, CAN. 0982969, GRB. 1442450, ITL. 1012805, SWD. 7406400.
3,902,715.—SHEET REGISTRATION FOR PAPER HANDLING APPARATUS. SEPT. 2, 1975, CAN. 1003867, ITL. 0993066, SPN. 0418255.
3,918,705.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. NOV. 11, 1975.
3,930,725.—MULTIPLE SHEET FEEDING SYSTEM FOR ELECTROSTATOGRAPHIC PRINTING MACHINES. JAN. 6, 1976. GRB. 1436457.
4,085,673.—SHEET FEEDING APPARATUS. APR. 25, 1978.

Class 6D 2

3,112,819.—CLUTCH MECHANISM—914. DEC. 3, 1963. CAN. 0688810.
3,337,015.—LATCH OPERATED AND ONE WAY COIL CLUTCHES. AUG. 22, 1967. CAN. 0810494, JAP. 0914622.
3,840,100.—UNIDIRECTIONAL COUPLING APPARATUS. OCT. 8, 1974. CAN. 1006706.

Class 6E

RE29124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,348,288.—DRUM CLAMP. OCT. 24, 1967. CAN. 0838542, GRB. 1123459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,567,213.—CONTROL APPARATUS FOR REGISTER STOPS AND GRIPPER FINGERS. MAR. 2, 1971.
3,685,898.—PAPER FLIP CONTROL APPARATUS. AUG. 22, 1972.
3,717,801.—METHODS AND APPARATUS FOR ELCLRSTCLY PRFMNG A TCKING OPERATION. FEB. 20, 1973.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,841,751.—ELECTROSTATIC COLOR REPRODUCTION METHOD. OCT. 15, 1974. CAN. 0946463.

3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974. CAN. 0999316.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,063,946.—ELECTROPHOTOGRAPHIC COLOR REPRODUCTION PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIAL WITH DUAL. DEC. 20, 1977.
4,078,862.—APPARATUS FOR PRODUCING A COMPOSITE COPY OF AN ORIGINAL DOCUMENT ON SELECTIVELY POSITIONED. MAR. 14, 1978.
4,082,137.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING AN ELECTROSTATOGRAPHIC MACHINE. APR. 4, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,085,794.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. APR. 25, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.

Class 6F

3,249,354.—MULTIPLE SHEET DETECTING DEVICE. MAY 3, 1966. CAN. 0770494.
3,281,145.—PAPER REJECT MECHANISM. OCT. 25, 1966. CAN. 0770493.
3,288,462.—APPARATUS FOR HANDLING SUPERPOSED SHEETS. NOV. 29, 1966. AUS. 0422882, CAN. 0786210, EIR. 0029759, GRB. 1122625, ISR. 0034135, JAP. 0894757, NOR. 0124531.
3,301,975.—SENSING DEVICE FOR DETECTING A SHEET ON A TRANSPORT OR DRUM. JAN. 31, 1967. CAN. 0800094, FRA. 1487581, GER. 1522699, GRB. 1077117, ITL. 0774188, JAP. 0923304.
3,360,652.—FAIL SAFE PHOTOELECTRIC SHEET SENSING MACHINE CONTROL CIRCUIT. DEC. 26, 1967. CAN. 0775268, FRA. 1455478, GER. 1522805, GRB. 1121099, ITL. 0732531, JAP. 0503244, MEX. 0078869.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.
3,504,911.—VACUUM POWERED MULTIPLE DOCUMENT DETECTOR. APR. 7, 1970. CAN. 0861362, FRA. 1589986, GER. 1804476, GRB. 1241968, ITL. 0845395, JAP. 0656984.
3,593,065.—SHEET DETECTION APPARATUS. JULY 13, 1971. CAN. 0923544, CZC. 0151559, EGR. 0100567, GRB. 1322794, JAP. 1162030, USR. 0365085.
3,614,419.—MULTIPLE SHEET DETECTION SYSTEM. OCT. 19, 1971. ARG. 0186441, BEL. 0765366, CAN. 0930052, FRA. 7113404, GRB. 1342656, ITL. 0922694, MEX. 0119754, VZL. 0021933.
3,627,311.—SHEET SENSOR. DEC. 14, 1971. CAN. 0871371, GRB. 1322258.
3,628,785.—GRIP FORCE DETECTION APPARATUS. DEC. 21, 1971. ARG. 0185946, AUS. 0455882, BEL. 0760750, CAN. 0923158, FRA. 7047695, GRB. 1340206, ITL. 0913997, MEX. 0117505, STZ. 0518227, SWD. 7017384, VZL. 0032788.
3,650,616.—MISPUFF DETECTOR. MAR. 21, 1972. BEL. 0778739, CAN. 0954181, FRA. 7203548, GRB. 1374923, ITL. 0947120.
3,650,617.—SWITCHING DETECTOR—A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR—B. MAR. 21, 1972.
3,650,619.—SWITCHING DETECTOR—C. MAR. 21, 1972.
3,684,890.—PHOTOSENSITIVE MISFEED DETECTOR. AUG. 15, 1972. CAN. 0929631, GRB. 1335444.
3,778,051.—SUPERPOSED SHEET DETECTOR. DEC. 11, 1973. CAN. 0975067.
3,791,729.—APPARATUS FOR MONITORING A SHEET TRANSPORT MECHANISM. FEB. 12, 1974. CAN. 0991244, GRB. 1413069.
3,882,308.—DETECTION SYSTEM FOR SUPERPOSED SHEETS. MAY 6, 1975. CAN. 0929632, GRB. 1342838.
3,932,755.—DEVICE FOR DETECTING DOUBLE SHEET FEEDING. JAN. 13, 1976.
3,948,508.—SHEET DETECTING APPARATUS. APR. 6, 1976.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.
4,077,519.—CURL DETECTOR AND SEPARATOR. MAR. 7, 1978.

Class 6G

3,152,757.—XEROGRAPHIC CONTROL APPARATUS. OCT. 13, 1964. JAP. 0494168.
3,260,455.—STEPPED COUNTING APPARATUS. JULY 12, 1966. ARG. 0157223, BRA. 0083779, CAN. 0760825, FRA. 1459930, GER. 1513422, GRB. 1113420, ITL. 0729650, MEX. 0094217.
3,301,126.—REPRODUCING APPARATUS. JAN. 31, 1967. CAN. 0777413, EIR. 0029760, GRB. 1122626, ISR. 0034136, JAP. 0669365, NOR. 0128732.
3,358,570.—COPY COUNTING SYSTEM. DEC. 19, 1967. CAN. 0842444, FRA. 1508192, GER. 1283855, GRB. 1165943, ITL. 0787991, JAP. 0572187.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,375,783.—COPY INDICATING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590, ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,655,281.—BILLING APPARATUS. APR. 11, 1972. BEL. 0760911, CAN. 0929013, FRA. 7047633, GRB. 1329579, ITL. 0913956, JAP. 0766713.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.
3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.
3,909,128.—CONTROL LOGIC FOR CHARGING A MULTI-MODE COPIER DUPLICATOR FROM ONE MODE TO ANOTHER. SEPT. 30, 1975. BEL. 0819383.
3,916,171.—COUNTING CIRCUIT. OCT. 28, 1975.
3,989,368.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER DUPLICATOR. NOV. 2, 1976. BEL. 0819384.
4,019,028.—PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM. APR. 19, 1977. BEL. 0812560, GRB. 1451992, ITL. 1010688, SPN. 0424462.
4,057,341.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 8, 1977. AUS. 489874, BEL. 819384, CAN. 1029431, GRB. 1470598, MEX. 137406.
4,058,815.—METERING SYSTEM FOR A COPIER/DUPLICATOR MACHINE. NOV. 15, 1977. BEL. 824682, FRA. 7501637, GRB. 1451991.

Class 6H

3,062,536.—SHEET STRIPPING APPARATUS. NOV. 6, 1962. ARG. 0174781, CAN. 0736834, PNM. 0001999, VZL. 0023703.
3,090,616.—SHEET HANDLING CONTROL APPARATUS. MAY 21, 1963. CAN. 0683777.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,357,400.—ELECTROSTATIC APPARATUS FOR PAPER DETACKING. DEC. 12, 1967. CAN. 0841229, MEX. 0100315.
3,450,402.—SHEET STRIPPER APPARATUS. JUNE 17, 1969.
3,506,259.—ELECTROSTATIC SHEET DETACKING APPARATUS. APR. 14, 1970. ARG. 0177881, AUS. 0418161, BEL. 0721966, CAN. 0848612, FRA. 1585343, GRB. 1230113, ITL. 0895052, MEX. 0104231.
3,578,859.—MECHANICAL STRIPPING APPARATUS. MAY 18, 1971. ARG. 0185526, AUS. 0445289, BEL. 0752938, CAN. 0922771, CHL. 0025913, EGR. 0085002, FRA. 7024669, GRB. 1296763, GUA. 0002611, ITL. 0900197, MEX. 0117139, PLD. 0081340, PNM. 0002049, SPN. 0381384, STZ. 0523150, SWD. 0366849, TIW. 0007785, USR. 0443525, VZL. 0032781.
3,620,615.—SHEET STRIPPING APPARATUS. NOV. 16, 1971. CAN. 0927472, GRB. 1290518.
3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972.
3,774,907.—VACUUM SHEET STRIPPING APPARATUS. NOV. 27, 1973. CAN. 0966519.
3,804,401.—PNEUMATIC STRIPPING APPARATUS. APR. 16, 1974. CAN. 0998705.
3,811,670.—ELECTROSTATOGRAPHIC APPARATUS WITH AIR BAFFLE. MAY 21, 1974.
3,819,175.—VACUUM STRIPPING ROLL WITH STATIONARY PICKUP SLOTS. JUNE 25, 1974.
3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,837,640.—STRIPPER FINGER WITH AIR CUSHION. SEPT. 24, 1974. CAN. 1002077, FRA. 7338663, GRB. 1427058, ITL. 998964.
3,857,560.—ADHESIVE PAPER PICK-OFF SYSTEM. DEC. 31, 1974.
3,885,785.—VACUUM TRANSPORT. MAY 27, 1975. CAN. 1008892, FRA. 7437717.
3,885,786.—STRIPPER FINGER. MAY 27, 1975. GRB. 1402956.
3,891,206.—SHEET STRIPPING APPARATUS. JUNE 24, 1975. CAN. 1003868, GRB. 1449754.
3,895,793.—VACUUM SHEET STRIPPER. JULY 22, 1975. CAN. 1014179.
3,907,280.—FLEXIBLE SHEET HANDING DEVICE. SEPT. 23, 1975. FRA. 7322885.
3,940,126.—SHEET HANDLING MECHANISM. FEB. 24, 1976. GRB. 1450219.
3,948,507.—COPYING STRIPPER. APR. 6, 1976.
3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188, FRA. 7406478, GRB. 1451288, ITL. 1008269, SPN. 0423529, STZ. 5672880.
3,991,999.—REVOLVING STRIPPER FINGER. NOV. 16, 1976.
3,992,000.—SHEET STRIPPER. NOV. 16, 1976.
3,998,536.—METHOD & APPARATUS FOR ELECTROSTATIC PAPER STRIPPING. DEC. 21, 1976.
4,004,802.—SHEET STRIPPING DEVICE. JAN. 25, 1977.
4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.
4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.
4,026,541.—SHEET STRIPPING DEVICE. MAY 31, 1977.
4,058,306.—DETACK AND STRIPPING SYSTEM. NOV. 15, 1977.
4,060,235.—SELF-LIFTING VACUUM STRIPPER. NOV. 29, 1977.
4,072,307.—CORNER SHEET STRIPPER. FEB. 7, 1978.
4,073,585.—SHEET REMOVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 14, 1978.
4,092,021.—UNFUSED IMAGE TRANSPORT. MAY 30, 1978.

Class 6I

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3,416,861-D1593. AUG. 7, 1973.
1,976,156.—PAPER CUTTING MACHINE. OCT. 9, 1934.
2,043,004.—PHOTOCOPY MACHINE. JUNE 2, 1936.
2,047,478.—PAPER FEEDING AND CUTTING MECHANISM. JULY 14, 1936.
2,216,629.—SLITTING AND CUTOFF MECHANISM FOR SHEET MATERIAL. OCT. 1, 1940.
3,075,493.—XEROGRAPHIC APPARATUS WITH WEB CUTTING MEANS. JAN. 29, 1963. CAN. 0682231, FRA. 1280975, GER. 1177487, GRB. 0979161, JAP. 0502929.
3,105,425.—WEB MARKING AND CUTTING APPARATUS FOR XEROGRAPHIC REPRODUCING DEVICES. OCT. 1, 1963. CAN. 0701949.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,244,084.—WEB MARKING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 5, 1966.
3,401,613.—WEB CUTTER CONTROL DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 17, 1968. CAN. 0786141, GRB. 1118217, JAP. 0517506.
3,402,628.—CUTTING APPARATUS. SEPT. 24, 1968. CAN. 0847666, GRB. 1137800.
3,416,061.—SIGNAL STORAGE DEVICE—REISSUED D72104—27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,466,959.—WEB MATERIAL HANDLING APPARATUS. SEPT. 16, 1969.
3,485,622.—PRINTING OF TIMING MARKS IN XEROGRAPHIC PROCESS. DEC. 23, 1969. FRA. 1488142, GER. 1522700, GRB. 1047451, JAP. 0608701.
3,504,586.—ROLL CONVERTER CONTROL. APR. 7, 1970.
3,506,175.—ROLL STOCK CONVERTING APPARATUS. APR. 14, 1970.
3,585,289.—FACSIMILE RECORDING APPARATUS WITH CAM OPERATED PAPER CUTTER. JUNE 15, 1971.
3,591,279.—CUT AND DEFLECT WEB DRIVE APPARATUS. JULY 6, 1971. CAN. 0924635, FRA. 7019910, GRB. 1307549, ITL. 0893691.
3,639,053.—WEB CUTTING AND FEEDING APPARATUS. FEB. 1, 1972. ARG. 0192554, AUS. 0461657, BEL. 0749786, CAN. 0917974, FRA. 7015812, GRB. 1314727, ITL. 0900026, MEX. 0116866, SAF. 0703019, SPN. 0379248, STZ. 0516181, SWD. 7006081.
3,728,920.—CUT AND DEFLECT WEB DRIVE APPARATUS. APR. 24, 1973.
3,743,409.—CUTTER ASSEMBLY. JULY 3, 1973. BEL. 0784635, CAN. 0974447, FRA. 7220418, GRB. 1400465, ITL. 0956414.
3,855,890.—SLITTER/PERFORATOR APPARATUS. DEC. 24, 1974. BEL. 808873, CAN. 0996462, FRA. 7345296, GRB. 1423770, ITL. 1001152, USR. 0546267.
3,882,744.—ELECTROSTATOGRAPHIC WEB FEEDING APPARATUS. MAY 13, 1975. FRA. 7417339.
3,931,090.—RUBBER COMPOSITIONS FOR FLEXIBLE BELTS. JAN. 6, 1976.
4,043,233.—METHOD OF PREVENTING MULTI-SHEET FEEDING. AUG. 23, 1977.

Class 6J

3,380,733.—SHEET STRIPPING APPARATUS. APR. 30, 1968. ATR. 0268045, AUS. 0413138, BEL. 0689067, CAN. 0819593, DNK. 0112289, FRA. 1499560, GER. 1522704, GRB. 1157342, HOL. 0151191, ITL. 0788572, JAP. 0560087, LXB. 0052213, MEX. 0101989, NOR. 0122220, NZL. 0146848, PTG. 0046633, SAF. 0666572, SPN. 0332819, STZ. 0468661, SWD. 0326103, USR. 0261292.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,548,783.—PAPER TRANSPORT - SHEET TURNER - PAPER TRANSPORT-90 DEG TURN. DEC. 22, 1970.
3,627,312.—RESTACKING APPARATUS. DEC. 14, 1971. AUS. 0447183, BEL. 0752942, CAN. 0922747, CHL. 0025830, EGR. 0084128, FRA. 7024663, GRB. 1312303, GUA. 0002616, ITL. 0900193, JAP. 791920, MEX. 0114980, PLD. 0081346, PNM. 0001953, SPN. 0381379, STZ. 0525779, SWD. 0359381, TIW. 0022313, VZL. 0032782.
3,856,295.—INVERTER-REVERSER FOR A REPRODUCTION MACHINE. DEC. 24, 1974.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,942,785.—SELF-ACTUATING SHEET INVERTER-REVERSER. MAR. 9, 1976.
3,944,212.—SHEET REVERSING MECHANISM. MAR. 16, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
4,040,616.—SHEET TURN AROUND INVERTER. AUG. 9, 1977. FRA. 7701111.

Class 6K

D.227,933.—SORTER. JULY 24, 1973.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.233,937.—SORTER. DEC. 17, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
3,395,913.—SHEET MATERIAL DISTRIBUTION SYSTEM. AUG. 6, 1968. AUS. 0409539, BEL. 0704922, CAN. 0832159, FRA. 1543565, GRB. 1193517, ITL. 0823413, JAP. 0645590, MEX. 0101165, USR. 0343419.
3,460,824.—MODULAR SHEET DISTRIBUTOR. AUG. 12, 1969. ARG. 0175858, ATR. 0304588, AUS. 0443802, CAN. 0871013, CHL. 0023362, CLB. 0016672, EIR. 0031307, FIN. 0047868, GRB. 1193514, IND. 0112001, ISR. 0028521, JAP. 0645589, MEX. 0099178, NOR. 0125174, NZL. 0149789, PAK. 0119258, PLP. 0006159, PRU. 0009362, SAF. 0674987, SPN. 0344350, STZ. 0478049, SWD. 0342203, TRK. 0014721, URG. 0008514, VZL. 0016672.
3,484,101.—SORTING APPARATUS FOR DOCUMENTS. DEC. 16, 1969. CAN. 0889441, GRB. 1246033.
3,552,739.—SHEET HANDLING APPARATUS. JAN. 5, 1971. BEL. 0738575, CAN. 0921945, FRA. 6930567, GRB. 1274277, ITL. 0871023.
3,565,420.—DOCUMENT FEEDING APPARATUS. FEB. 23, 1971. ARG. 0184075, AUS. 0453309, BEL. 0750391, CAN. 0922328, EGR. 0082941, FRA. 7017112, GRB. 1305825, ITL. 0893198, MEX. 0117914, PLD. 0082841, SPN. 0379694, STZ. 0513435, SWD. 0368797, USR. 0476767.
3,589,808.—REPRODUCING APPARATUS. JUNE 29, 1971. CAN. 0917482.

3,618,936.—JAM DETECTION SYSTEM FOR SORTING APPARATUS. NOV. 9, 1971. AUS. 0445492, BEL. 0758059, CAN. 0949671, EGR. 0088009, FRA. 7041622, GRB. 1324119, ITL. 0909902, PLD. 0081147, SPN. 0385034, STZ. 0525723, TIW. 0007648.
3,622,061.—STAPLE FEED AND FASTENING APPARATUS. NOV. 23, 1971.
3,630,607.—SET SEPARATION COPIER SYSTEM. DEC. 28, 1971.
3,649,006.—SHEET HANDLING APPARATUS. MAR. 14, 1972. BEL. 0762643, CAN. 0944310, FRA. 7104922, GRB. 1341286, ITL. 0918344, JAP. 0795150.
3,652,875.—CONTROL CIRCUIT FOR DRIVING STAPLING MECHANISM. MAR. 28, 1972.
3,669,447.—SHEET PROPELLING APPARATUS. JUNE 13, 1972. CAN. 0938624.
3,671,094.—COVER APPARATUS. JUNE 20, 1972.
3,682,328.—TRAY APPARATUS. AUG. 8, 1972.
3,685,712.—STAPLING APPARATUS. AUG. 22, 1972. CAN. 0953851.
3,690,537.—STAPLE FORMING AND FASTENING APPARATUS. SEPT. 12, 1972.
3,695,756.—SHEET STRIPPING APPARATUS. OCT. 3, 1972. BEL. 0774563, CAN. 0950931, FRA. 7139637, GRB. 1366909, ITL. 0937673.
3,707,418.—METHOD OF BINDING. DEC. 26, 1972. CAN. 0974723, EGR. 0094346, GRB. 1359338.
3,709,485.—CONTROL CIRCUIT FOR SORTING SYSTEM. JAN. 9, 1973.
3,709,492.—SORTING APPARATUS. JAN. 9, 1973. ARG. 0194366, AUS. 0457968, BEL. 0783854, CAN. 0968300, FRA. 7218317, GRB. 1365399, ITL. 0955692, MEX. 0127721, SPN. 0403108, STZ. 0555198.
3,719,266.—SHEET STACKING APPARATUS. MAR. 6, 1973.
3,735,978.—METHOD AND APPARATUS FOR STACKING COPY SHEETS. MAY 29, 1973. ARG. 0190825, BEL. 0772406, CAN. 0951340, FRA. 7133309, GRB. 1358420, ITL. 0936377, MEX. 0125745.
3,788,640.—MOVING BIN SORTING APPARATUS. JAN. 29, 1974. CAN. 0996495, FRA. 7346312, GRB. 1429726.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,833,911.—REPRODUCTION SYSTEM AND METHOD WITH SIMPLEX AND DUPLEX MODES OF OPERATION. SEPT. 3, 1974.
3,841,754.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974.
3,841,827.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974. BEL. 0816155, FRA. 7419739, GER. 7409422, GRB. 1441370.
3,845,949.—SORTER CONTROL TO PREVENT OVERSTACKING IN THE SORTER TRAYS. NOV. 5, 1974. BEL. 808173, CAN. 1005511, FRA. 7342816, GRB. 1436599, ITL. 1002130, SPN. 0421148.
3,848,995.—COPIER/DUPLICATOR SYSTEM. NOV. 19, 1974. BEL. 0815548, GRB. 1450847, ITL. 1012907, SPN. 0426782.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,861,861.—FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,866,904.—MULTIPLE FEED SORTING APPARATUS. FEB. 18, 1975. CAN. 1001109, GRB. 1432790.
3,868,019.—TRAY APPARATUS. FEB. 25, 1975. FRA. 7346312, CAN. 0996495, FRA. 7346912, GRB. 1429726.
3,870,295.—SORTER SUPPLEMENT CONTROL. MAR. 11, 1975. CAN. 1007283.
3,871,643.—SORTER CONTROL. MAR. 18, 1975. BEL. 808172, CAN. 1000647, GRB. 1422029, ITL. 1002129, SPN. 0421116.
3,878,818.—CLEANING APPARATUS FOR DRY FUSER ROLLS. APR. 22, 1975. FRA. 7427783, GRB. 1464759.
3,880,119.—DEVELOPMENT APPARATUS. APR. 29, 1975.
3,902,709.—BINLESS SORTER. SEPT. 2, 1975. FRA. 7436985.
3,907,276.—WOBBLE JOGGER. SEPT. 23, 1975.
3,908,978.—BINLESS SORTING APPARATUS. SEPT. 30, 1975. CAN. 0996586, GRB. 1426020.
3,917,256.—DUAL PURPOSE SHEET HANDLING APPARATUS. NOV. 4, 1975. CAN. 1014098.
3,917,257.—SHEET INVERTER APPARATUS. NOV. 4, 1975. CAN. 1005009, FRA. 7346309, GRB. 1430620.
3,938,802.—SHEET STACKING APPARATUS. FEB. 17, 1976. CAN. 1010462, GRB. 1431605.
3,941,369.—SHEET DISTRIBUTING APPARATUS. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,953,023.—BIN INDICATOR DEVICE. APR. 27, 1976.
3,971,554.—SHEET STACKER. JULY 27, 1976.
3,973,769.—COMPACT SORTING APPARATUS. AUG. 10, 1976. BEL. 0836261.
3,977,667.—SORTING APPARATUS. AUG. 31, 1976.
3,988,817.—PRESSURE ROLL FOR FUSER APPARATUS. NOV. 2, 1976.
3,990,695.—SORTING APPARATUS. NOV. 9, 1976.
3,995,748.—SORTER APPARATUS. DEC. 7, 1976. BEL. 0844420.
4,011,952.—MANUAL SORTER. MAR. 15, 1977.
4,012,034.—MULTIPLE MODULAR SORTER ASSEMBLY. MAR. 15, 1977.
4,012,035.—SORTER CONTROL SYSTEM. MAR. 15, 1977.
4,015,841.—SORTER. APR. 5, 1977.
4,022,458.—SHEET DISTRIBUTION APPARATUS. MAY 10, 1977.
4,029,309.—SET TRANSPORT AND STACKER. JUNE 14, 1977. BEL. 0847844.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,037,832.—IMPROVED SORTER APPARATUS. JULY 26, 1977.
4,038,594.—DISTORTIONLESS LINE WAVE AMPLIFICATION. JULY 26, 1977.
4,049,180.—STITCHING HEAD BYPASS APPARATUS. SEPT. 20, 1977.
4,055,339.—SORTER APPARATUS. OCT. 25, 1977.
4,069,728.—SHEET SLITTING APPARATUS. JAN. 24, 1978.
4,084,809.—SHEET STACKING APPARATUS. APR. 18, 1978.
4,087,087.—SHEET STACKING APPARATUS FOR SORTER. MAY 2, 1978.

Class 7

3,784,300.—PRE-TRANSFER STATION. JAN. 8, 1974. AUS. 0465154, BEL. 0789340, CAN. 1000782, EGR. 0106095, FRA. 7234200, GRB. 1379826, ITL. 0972691, MEX. 0128584, SPN. 0409975, STZ. 0557051, SWD. 7215168.
3,809,471.—PHOTOELECTROPHORETIC IMAGING APPARATUS WITH CORRECTION FOR PARALLAX. MAY 7, 1974.
3,819,263.—CLEANING APPARATUS. JUNE 25, 1974. ARG. 0200252, AUS. 0469469, BEL. 0796984, EGR. 0104374, FRA. 2177733, GRB. 1421929, ISR. 0041829, ITL. 0983618, MEX. 131438, SAF. 0732067, SPN. 0439774, STZ. 0556047, SWD. 7304022.

Class 7A

3,850,517.—HIGH SPEED PRINTOUT SYSTEM. NOV. 26, 1974.

Class 7A 1

3,051,041.—IMAGE PROJECTION. AUG. 28, 1962. CAN. 0734194, GRB. 0956359.
3,148,581.—CYLINDRICAL SURFACE PROJECTION APPARATUS. SEPT. 15, 1964.
3,273,999.—IMAGE DEFORMATION UTILIZING A PRISM. SEPT. 20, 1966. AUS. 0274351, CAN. 0840628, FRA. 1367772, GRB. 1034097, ITL. 0699466, SAF. 0002971, SWD. 0306232.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

Class 7A 2

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

Class 7A 2A

3,999,038.—FLARED FUSER ROLLL. DEC. 21, 1976.

Class 7B

3,501,294.—METH OF TREATNG SURFACE OF XIC PLATE W/METAL SALT OF A FATTY ACID TO IMPROVE IMAGE TRANSFER. MAR. 17, 1970. ARG. 0168294, AUS. 0419434, BEL. 0706369, CAN. 0880230, CHL. 0027764, FRA. 1544449, GRB. 1209644, ITL. 0822799, MEX. 0102265, PNM. 0002797, SWD. 0340047, VZL. 0023670.

3,690,754.—CONTROL SYSTEM FOR AN OPTICAL IMAGING SYSTEM. SEPT. 12, 1972. CAN. 0949797, GRB. 1337420.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.

4,066,802.—COLORED XEROGRAPHIC IMAGE TRANSFER PROCESS. JAN. 3, 1978.

Class 7C

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.

2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.

2,684,901.—IMAGE TRANSFER DEVICE. JULY 27, 1954.

2,847,305.—XEROGRAPHIC TRANSFER PROCESS. AUG. 12, 1958.

2,919,191.—XEROGRAPHIC TRANSFER METHOD. DEC. 29, 1959.

2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.

3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.

3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.

3,620,616.—TRANSFER DRUM WITHDRAWAL APPARATUS. NOV. 16, 1971. BEL. 0751487, CAN. 0923543, FRA. 7020458, GRB. 1300267, ITL. 0893835.

3,633,543.—BIASED ELECTRODE TRANSFER APPARATUS. JAN. 11, 1972. CAN. 0914398, GRB. 1337123, JAP. 783769.

3,781,105.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. DEC. 25, 1973. FRA. 7341869, GRB. 1448385.

3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.

3,822,093.—TRANSFER REGULATING APPARATUS. JULY 2, 1974. FRA. 7428422.

3,830,589.—CONDUCTIVE BLOCK TRANSFER SYSTEM. AUG. 20, 1974.

3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.

3,832,055.—FORAMINOUS VACUUM BIAS ROLL TRANSFER SYSTEM. AUG. 27, 1974. CAN. 0999316.

3,837,741.—CONTROL ARRANGEMENT FOR TRANSFER ROLL POWER SUPPLY. SEPT. 24, 1974.

3,837,883.—IMAGE TRANSFER PROCESS. SEPT. 24, 1974. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,842,800.—TRANSFER ROLLER ASSEMBLY. OCT. 22, 1974. BEL. 0793553, CAN. 9780221, FRA. 7237770, GRB. 1412454, ITL. 0973320, SPN. 0410173, SWD. 7216978.

3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.

3,847,119.—TRANSFER ROLLER ASSEMBLY. NOV. 12, 1974. ARG. 0196224, ATR. 327002, AUS. 0464751, BEL. 0796983, CAN. 0977206, EGR. 0103979, FRA. 7305277, GER. 0103979, GRB. 1413711, ISR. 0041830, ITL. 0983617, MEX. 131018, SAF. 0722068, SPN. 0413018, STZ. 0558033, SWD. 7304021.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.

3,860,436.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. JAN. 14, 1975. FRA. 7341869, GRB. 1448385.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

3,877,416.—HUMIDITY CORRECTED TRANSFER APPARATUS. APR. 15, 1975. BEL. 0814054, GRB. 1445671, ITL. 1009955, STZ. 0573612.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

3,901,186.—TRANSFER ROLLER ASSEMBLY. AUG. 26, 1975. BEL. 0816848, FRA. 7423024.

3,924,943.—SEGEMENTED BIASED TRANSFER MEMBER. DEC. 9, 1975.

3,936,175.—INTERNALLY SHIELDED TRANSFER ROLLER. FEB. 3, 1976.

3,942,888.—STEPPED TRANSFER ROLLER. MAR. 9, 1976.

3,957,367.—A COLOR ELECTROSTATOGRAPHIC PRINTING MACHINE. MAY 18, 1976.

3,959,574.—BIASABLE MEMBER AND METHOD FOR MAKING. MAY 25, 1976.

3,994,579.—TRANSFER SYSTEM FOR ELECTROPHOTOGRAPHIC PRINTING. NOV. 30, 1976.

4,014,605.—TRANSFER SYSTEM WITH TAILORED ILLUMINATION. MAR. 29, 1977.

4,023,894.—TRANSFER APPARATUS. MAY 17, 1977.

4,025,182.—A TRANSFER APPARATUS FOR A COLOR ELECTROPHOGRAPHIC PRINTING MACHINE. MAY 24, 1977.

4,055,380.—TRANSFER CHARGE MAINTAINING SYSTEM. OCT. 25, 1977.

4,058,879.—COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICE. NOV. 22, 1977.

4,062,812.—METHOD FOR EXTENDING THE FUNCTIONAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICES. DEC. 13, 1977.

4,087,169.—TRANSFER ROLLER SYSTEM. MAY 2, 1978.

4,098,227.—BIASED FLEXIBLE ELECTRODE TRANSFER. JULY 4, 1978.

Class 7C 1

2,626,865.—PORTABLE ELECTROPHOTOGRAPHIC POWDER-IMAGE TRANSFER MECHANISM. JAN. 27, 1953.

2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.

2,807,232.—XEROGRAPHIC POWDER-IMAGE TRANSFER SQUEEGEE. SEPT. 24, 1957.

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

2,995,108.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. AUG. 8, 1961.

3,150,003.—APPARATUS FOR TRANSFERRING XEROGRAPHIC IMAGES. SEPT. 22, 1964.

3,150,004.—XEROGRAPHIC TRANSFER APPARATUS. SEPT. 22, 1964.

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GER. 1597884, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,765,330.—XEROPRINTING EMPLOYING LETTER PRESS SURFACE COVERED WITH A LAYER OF RESISTIVE MATERIAL. OCT. 16, 1973. CAN. 0949806, GRB. 1374651.

3,850,519.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. NOV. 26, 1974. ARG. 0202116, BEL. 0809579, GRB. 1446252, ITL. 1006786, MEX. 0135278, SPN. 0422230, STZ. 0567748, SWD. 7400197, VZL. 0033340.

3,870,515.—METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE. MAR. 11, 1975.

3,877,417.—TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES. APR. 15, 1975.

3,918,403.—CORONA TRANSFER MECHANISM. NOV. 11, 1975.

3,920,325.—MOISTURE STABLE BIAS TRANSFER ROLL. NOV. 18, 1975.

3,966,199.—BELT TRANSFER LOADING SYSTEM. JUNE 29, 1976.

4,014,606.—REPRODUCTION MACHINE WITH TEXTURED TRANSFER ROLLER. MAR. 29, 1977.
4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.
4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.
4,058,306.—DETACK AND STRIPPING SYSTEM. NOV. 15, 1977.
4,076,407.—DUPLEX COPYING TRANSFER SYSTEM. FEB. 28, 1978.
4,077,709.—TRANSFER CHARGE CONTROL SYSTEM. MAR. 7, 1978.
4,080,053.—TRANSFER APPARATUS AND METHOD. MAR. 21, 1978.

Class 7C 1A

2,892,708.—XEROGRAPHIC TRANSFER PROCESS. JUNE 30, 1959.
3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.
3,319,604.—XEROGRAPHIC TRANSFER APPARATUS. MAY 16, 1967.

Class 7C 2

3,132,037.—XEROGRAPHIC TRANSFER METHOD. MAY 5, 1964. CAN. 0727919.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,817,616.—THERMAL CHAMBER FOR DEVELOPABILITY REGULATING APPARATUS. JUNE 18, 1974. CAN. 0991247, GRB. 1439527.
3,838,918.—TRANSFER APPARATUS. OCT. 1, 1974. BEL. 0811434, GRB. 1445243, ITL. 1008903.
3,892,962.—THERMAL CHAMBER FOR A DEVELOPABILITY REGULATING APPARATUS. JULY 1, 1975. CAN. 0991247, GRB. 1439527.

Class 7C 3

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.
2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.
3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.
3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.
3,612,677.—ELECTROSTATIC TRANSFER APPARATUS. OCT. 12, 1971. CAN. 0941220, GRB. 1296742.
3,697,170.—AUTOMATIC DUPLEXING APPARATUS. OCT. 10, 1972. CAN. 0948269.
3,697,171.—SIMULTANEOUS IMAGE TRANSFER. OCT. 10, 1972. ARG. 0192330, AUS. 0461728, BEL. 0777016, CAN. 0948267, FRA. 7146256, GRB. 1368456, ITL. 0944212, MEX. 0124562, SWD. 0366123, VZL. 32765.
3,702,482.—BIAS ROLL TRANSFER. NOV. 7, 1972. ARG. 0191238, BEL. 0777017, CAN. 0962890, FRA. 7146257, GRB. 1368500, ITL. 0944209, MEX. 0126775.
3,734,015.—SINGLE PASS DUPLEXING BY SEQUENTIAL TRANSFER. MAY 22, 1973. ARG. 0192332, BEL. 7777018, CAN. 0948691, FRA. 7146258, GRB. 1368496, ITL. 0944211, MEX. 0124992.
3,902,801.—COLOR CORRECTED PRINTING SYSTEM. SEPT. 2, 1975. GRB. 1465590.
4,093,457.—METHOD OF TRANSFER. JUN. 6, 1978.

Class 7C 4

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.
3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.
3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, FRA. 1540696, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.
3,640,249.—TRANSFER APPARATUS. FEB. 8, 1972. BEL. 0758058.
3,647,292.—TRANSFER APPARATUS. MAR. 7, 1972. AUS. 0450919, BEL. 0759452, CAN. 0919004, FGR. 0086978, FRA. 7043065, GRB. 1319148, ITL. 0909441, JAP. 0773213, SPN. 0385845, STZ. 0519187, SWD. 7015876.
3,650,617.—SWITCHING DETECTOR-A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR-B. MAR. 21, 1972.
3,687,545.—SHORT FOCAL LENTH OPTICAL IMAGING SYSTEM. AUG. 29, 1972. BEL. 0747977, CAN. 0913438, FRA. 7011547, GRB. 1300156, ITL. 0898935, JAP. 0731226.
3,729,311.—ELECTROSTATIC TRANSFER METHOD. APR. 24, 1973.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537, GRB. 1429518.

Class 7D

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 7E

3,013,526.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. DEC. 19, 1961.
3,063,351.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. NOV. 13, 1962. CAN. 0706541.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,687,541.—XEROGRAPHIC DUPLEX TECHNIQUE. AUG. 29, 1972. CAN. 0948268.
3,847,642.—METHOD FOR TRANSFERRING ELECTROSTATOGRAPHICALLY FORMED IMAGES. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,867,168.—TRANSPARENCY. FEB. 18, 1975.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,936,174.—TRANSFER ROLLER WITH STATIONARY INTERNAL ELECTRODE. FEB. 3, 1976.
3,954,332.—REPRODUCTION MACHINE WITH IMPROVED TRANSFER ROLL. MAY 4, 1976.
3,954,333.—TRANSFER ROLL HAVING MEANS FOR MONITORING AND CONTROLLING THE RESITIVITY THEREOF. MAY 4, 1976.
3,977,779.—ELECTROSTATOGRAPHIC TRANSFER WITH AIR. AUG. 31, 1976. GRB. 1459450.

Class 7E 1

2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.
3,013,878.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. DEC. 19, 1961.

3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,685,896.—DUPLICATING METHOD AND APPARATUS. AUG. 22, 1972.
3,845,742.—FUSER ROLL CONSTRUCTION. NOV. 5, 1974. GRB. 1450882.
3,849,062.—REINFORCED FUSER ROLL CONSTRUCTION. NOV. 19, 1974.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.
4,066,802.—COLORED XEROGRAPHIC IMAGE TRANSFER PROCESS. JAN. 3, 1978.

Class 7E 2

2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.

Class 7E 3

2,661,289.—ADHESIVE TRANSFER AND FIXING APPARATUS. DEC. 1, 1953.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721 FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.
4,064,285.—ELECTROPHOTOGRAPHIC DECALCOMANIAS. DEC. 20, 1977.

Class 7E 3A

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 8

3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 8A

D.233,414.—TONER BOTTLE OR THE LIKE. OCT. 29, 1974.
2,990,278.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. JUNE 27, 1961.
3,130,064.—METHOD OF FORMING RESIN PATTERN ON A PAPER RECORD CARD. APR. 21, 1964.
3,778,222.—FIRE PREVENTION APPARATUS. DEC. 11, 1973.
3,830,590.—SORTER APPARATUS OF PRINTER SYSTEM. AUG. 20, 1974. AUS. 0466096, BEL. 0791361, CAN. 0998425, CHL. 0027890, EGR. 0102488, FRA. 7240557, GRB. 1400619, IND. 0137843, ISR. 0040831, ITL. 0970911, MEX. 0128646, NOR. 0135210, NZL. 0168971, PLP. 0008722, PTG. 0058789, SAF. 0728101, SPN. 0408628, STZ. 0560108.
3,834,861.—PRESSURE HEATED FUSER ASSEMBLY. SEPT. 10, 1974. GRB. 1424307.
3,847,391.—STACKING CONTROL APPARATUS. NOV. 12, 1974. ARG. 0194365, AUS. 0454812, BEL. 0783855, CAN. 0969205, FRA. 7218318, GRB. 1365400, ITL. 0955693, MEX. 0128712, SPN. 0403109, STZ. 0557242.
3,848,868.—SHEET SORTING APPARATUS. NOV. 19, 1974. CAN. 1005387, GRB. 1440557.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050, FRA. 7435222.
3,868,744.—CLEANING APPARATUS FOR HEATED PRESSURE ROLL FUSER. MAR. 4, 1975. AUS. 0466542, BEL. 0794569, CAN. 1007407, FRA. 7302888, GRB. 1424132, ITL. 0978560, SPN. 0410976, SWD. 7301015.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
3,998,450.—IMPROVED SORTING APPARATUS. DEC. 21, 1976. GRB. 1433088.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,006,985.—XEROGRAPHIC APPARATUS HAVING TIME CONTROLLED FUSING. FEB. 8, 1977.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,065,586.—FIXING METHOD USING POLYARYLSILOXANES AS RELEASE AGENTS. DEC. 27, 1977.
4,078,286.—HEAT FIXING ROLL FOR ELECTROPHOTOGRAPHIC DUPLICATORS. MAR. 14, 1978.
4,078,948.—FIXING METHOD. MAR. 14, 1978.

Class 8A 1

RE.28,802.—FUSING APPARATUS. MAY 4, 1976. CAN. 0990779, FRA. 7338110, GRB. 1436563.
2,586,484.—FUSING DEVICE. FEB. 19, 1952.
2,965,868.—RESISTANCE TYPE HEATING ELEMENTS. DEC. 20, 1960. CAN. 0643795, GER. 1810418, GRB. 0948916, JAP. 0319003.
3,079,483.—XEROGRAPHIC FIXING APPARATUS. FEB. 26, 1963. ARG. 0155449, CAN. 0682500, GRB. 1032955, IND. 0096312.
3,083,623.—TRANSFERRED IMAGE APPARATUS. APR. 2, 1963. CAN. 0701631.
3,219,326.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965. CAN. 0716212.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,409,280.—POROUS DRUM FUSER. NOV. 5, 1968.
3,411,932.—QUALITY XEROGRAPHIC REPRODUCTIONS. NOV. 19, 1968. CAN. 0788948, FRA. 1459094, GER. 1497213, GRB. 1112000, ITL. 0725763, MEX. 0078900.
3,498,592.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0180584, AUS. 0432632, BEL. 0733403, CAN. 0878082, CZC. 0164830, FRA. 6917080, GRB. 1269716, ITL. 0864984, MEX. 0111516, PNM. 0001417, SPN. 0367614, STZ. 0506821, SWD. 0345328, TIW. 0006603, USR. 0340215.
3,519,253.—SELECTIVE XEROGRAPHIC FUSER. JULY 7, 1970. ARG. 0168753, ATR. 0293871, AUS. 0416089, BEL. 0704925, CAN. 0843377, CHL. 0023289, CLB. 0017682, DNK. 0123893, FRA. 1540701, GRB. 1193355, GUA. 0002145, HUN. 0157550, ITL. 0830722, JAM. 0001850, MEX. 0107890, PRU. 0009344, SAF. 0676018, SPN. 0345919, STZ. 0470698, SWD. 0322690, TRD. 0000113, URG. 0008846, USR. 0372852, VZL. 0026101.
3,535,492.—FUSING APPARATUS. OCT. 20, 1970. ARG. 0181204, BEL. 0733663, CAN. 0872978, FRA. 6917190, GRB. 1266932, HOL. 149013, ITL. 0865914, MEX. 0110755.
3,623,710.—FIXING ARRANGEMENT. NOV. 30, 1971.
3,648,991.—METHOD AND APPARATUS FOR SELECTIVE FUSING. MAR. 14, 1972.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,770,346.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. NOV. 6, 1973. CAN. 1002582, GRB. 1421863.
3,781,517.—FUSER THERMAL PROTECTOR. DEC. 25, 1973. GRB. 1441702.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.

3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,826,892.—FUSING APPARATUS. JULY 30, 1974. CAN. 0990779, FRA. 7338110, GRB. 1436563.
3,849,905.—FUSING APPARATUS. NOV. 26, 1974.
3,849,907.—FUSING APPARATUS. NOV. 26, 1974.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,874,892.—ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER. APR. 1, 1975. CAN. 0980405, GRB. 1374652.
3,898,424.—RADIANT FUSER XEROGRAPHIC REPRODUCING APPARATUS. AUG. 5, 1975.
3,907,492.—FUSING APPARATUS. SEPT. 23, 1975. CAN. 0990779, GRB. 1436563.
3,939,326.—DUAL RIBBON FUSER. FEB. 17, 1976.
3,944,784.—DUAL RIBBON FUSER. MAR. 16, 1976.
3,953,709.—TWO SOURCE RADIANT FUSER FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 27, 1976.
3,987,757.—PAPER HANDLING IMPROVEMENTS IN RADIANT FUSER VIA CORRUGATION OF PAPER. OCT. 26, 1976.
4,001,622.—DIRECTIONAL SOURCES OF ELECTROMAGNETIC RADIATION. JAN. 4, 1977. GRB. 1443340.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,021,641.—RADIANT FUSER FOR FIXING TONER IMAGES. MAY 3, 1977.
4,056,706.—APPARATUS & METHOD FOR EXTENDING FUSER RELEASE LIFE. NOV. 1, 1977.
4,064,313.—HEAT FIXING MEMBER FOR ELECTROPHOTOGRAPHIC COPIERS. DEC. 20, 1977.
4,078,285.—HARD ALLOY FUSER MEMBERS. MAR. 14, 1978.
4,092,099.—COPIER PAPER DELIVERY MEANS IN A HEAT-FIXING DEVICE OF A COPYING MACHINE. MAY 30, 1978.
4,102,681.—TRANSFER AND FUSING METHOD. JULY 25, 1978. CAN. 990779, FRA. 7338110.

Class 8A 1A

3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,465,203.—FLASH LAMP FOR ELECTROSCOPIC TONER. SEPT. 2, 1969. CAN. 0843526, GER. 1589315, GRB. 1185687, JAP. 0758339.
3,474,223.—SELECTIVE FLASH FUSING. OCT. 21, 1969. CAN. 0851811, FRA. 1546257, GRB. 1208770, JAP. 0558445.
3,529,129.—REFLECTION TYPE FLASH FUSER. SEPT. 15, 1970. ARG. 0180678, BEL. 0728716, CAN. 0855311, FRA. 6004567, GRB. 1252465, ITL. 0866971, JAP. 0661180, MEX. 0107835.
3,566,076.—TONER FIXING APPARATUS. FEB. 23, 1971. CAN. 0913164, GRB. 1256471.
3,655,280.—XEROGRAPHIC FUSING METHOD AND APPARATUS. APR. 11, 1972.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,865,081.—MAGNETIC BRUSH DEVELOPING APPARATUS. FEB. 11, 1975.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,394.—READ/WRITE APPARATUS FOR MAGNETIC RECORDERS. SEPT. 2, 1975.
3,920,952.—DUPLEX FUSING APPARATUS AND METHOD. NOV. 18, 1975.
3,935,424.—FLASH FUSING APPARATUS. JAN. 27, 1976.
3,944,783.—HIGH EFFICIENCY NON CAVITY RADIANT METHOD AND APPARATUS. MAR. 16, 1976.
3,980,424.—FUSER CLEANING ROLLER. SEPT. 14, 1976.
4,001,541.—FLASH FUSING SYSTEM WITH ENERGY CONTROL. JAN. 4, 1977.
4,027,199.—FLASH LAMP MODULATOR SYSTEM. MAY 31, 1977.
4,039,770.—INTERFACE SYSTEM TO CONTROL FLASH LAMP. AUG. 2, 1977.
4,050,801.—RELEASE AGENT APPLICATION SYSTEM FOR A HEATED FUSER ROLL. SEPT. 27, 1977.
4,050,803.—QUICK RELEASE MECHANISM FOR A BACKUP ROLL FUSER EMPLOYED IN A COPIER APPARATUS. SEPT. 27, 1977
4,090,108.—INTERFACE SYSTEM TO CONTROL FLASH LAMP. MAY 16, 1978.

Class 8A 1B

2,852,651.—FUSING MECHANISM FOR A XEROGRAPHIC COPYING MACHINE. SEPT. 16, 1958. CAN. 0619281.
3,053,962.—XEROGRAPHIC FUSING APPARATUS. SEPT. 11, 1962. CAN. 0657396, GER. 1165413, GRB. 0999763.
3,357,401.—XEROGRAPHIC FUSER MONITORING APPARATUS. DEC. 12, 1967.
3,432,639.—FUSING APPARATUS. MAR. 11, 1969. CAN. 0851810, GRB. 1194234, JAP. 0608702.
3,437,407.—XEROGRAPHIC FUSING SYSTEM. APR. 8, 1969. CAN. 0842370, JAP. 0758338.
3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,449,546.—INFRA-RED HEATER. JUNE 10, 1969. ARG. 0170237, ATR. 0303518, AUS. 0402657, BEL. 0700101, BRA. 6788714, CAN. 0852819, CHL. 0023085, DNK. 0118703, FRA. 1527629, GRB. 1187481, ITL. 0805313, MEX. 0101251, NOR. 0123480, PLD. 0068551, PRU. 0009320, SAF. 0673601, SPN. 0341906, STZ. 0499143, SWD. 0332936, URG. 0008615, VZL. 0026103.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,558,853.—FUSER SYSTEM FOR COPYING MACHINE. JAN. 26, 1971. ARG. 0186145, ATR. 0309984, AUS. 0446113, BEL. 0750389, BRA. 7019023, CAN. 0874013, CZC. 0168526, EGR. 0083065, FRA. 7017316, GRB. 1309129, ITL. 0893097, JAP. 0836943, MEX. 0117915, NZL. 0160101, SPN. 0379651, STZ. 0506817, SWD. 0357840, TIW. 0006834, VZL. 0032597.
3,588,445.—FUSER CONTROL CIRCUIT. JUNE 28, 1971.
3,735,092.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. MAY 22, 1973. CAN. 0991254, GRB. 1406655.
3,781,516.—FUSER CONTROL SYSTEM. DEC. 25, 1973. MEX. 0135422.
3,790,747.—REGULATOR FOR XEROGRAPHIC FUSING APPARATUS. FEB. 5, 1974. ARG. 0200245, AUS. 0467385, BEL. 0789339, CAN. 0991252, FRA. 7234199, GRB. 1397586, ITL. 0972690, MEX. 0129168, SPN. 0409974, STZ. 0554008, SWD. 7215167, VZL. 0032607.
3,833,794.—FIXING UNIT FOR USE IN A DUPLICATING APPARATUS. SEPT. 3, 1974.
3,851,144.—FEEDBACK FUSER FOR 730S. NOV. 26, 1974.
3,989,370.—ADAPTIVE FUSER CONTROLLER. NOV. 2, 1976.
3,989,926.—DEVICE FOR PREVENTING OVERHEATING OF ELECTROPHOTOGRAPHIC FIXING DEVICE. NOV. 2, 1976.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

Class 8A 1C

3,076,083.—XEROGRAPHIC FIXING APPARATUS. JAN. 29, 1963.

Class 8A 2

2,701,765.—XEROGRAPHIC FUSING APPARATUS. FEB. 8, 1955. CAN. 0530525.
3,349,702.—FUSER HAVING HEATED AND UNHEATED PORTIONS FOR PRINT FIXING PURPOSES. OCT. 31, 1967. CAN. 0833789, MEX. 0096468.
3,356,831.—XEROGRAPHIC FUSING APPARATUS. DEC. 5, 1967. CAN. 0798466, FRA. 1465786, GER. 1497228, GRB. 1117339, ITL. 0749552, JAP. 0512652.
3,584,195.—HEAT FIXING APPARATUS. JUNE 8, 1971. GRB. 1322354.
3,718,390.—MICROFICHE INDEXER. FEB. 27, 1973. ARG. 0190620, BEL. 0768712, CAN. 0946659, GRB. 1350656, ITL. 0927453, MEX. 0121626, SWD. 7107727.
3,788,873.—FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER. JAN. 29, 1974.
3,810,735.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAY 14, 1974.
3,849,628.—NON-CONTACT TEMPERATURE SENSOR FOR ROLL FUSER OF A XEROGRAPHIC REPRODUCTION APPARATUS. NOV. 19, 1974. CAN. 1002583, GRB. 1322612.
3,881,859.—STRIPPER FINGER DESIGN TO PREVENT OIL-ON-THE-COPY. MAY 6, 1975.
3,900,590.—XEROGRAPHIC FUSING APPARATUS. AUG. 19, 1975. CAN. 0992614, GRB. 1192444.
3,904,354.—RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL. SEPT. 9, 1975.
3,937,637.—ROLL CONTACT FUSER. FEB. 10, 1976.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.

3,976,814.—FUSING DEVICE & METHOD. AUG. 24, 1976.
3,997,691.—FUSING SURFACE AND METHOD FOR FIXING TONER. DEC. 14, 1976.
4,000,339.—FUSING SURFACE & METHOD FOR FIXING XEROGRAPHIC TONER. DEC. 28, 1976.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,029,827.—MERCAPTO FUNCTIONAL POLYORGANOSILOKANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS. JUNE 14, 1977. SPN. 0439743.
4,054,410.—FUSING DEVICE. OCT. 18, 1977.
4,056,706.—APPARATUS & METHOD FOR EXTENDING FUSER RELEASE LIFE. NOV. 1, 1977. FRA 7611767.
4,075,390.—FUSING SURFACE AND METHOD FOR FIXING TONER. FEB. 21, 1978.
4,101,686.—METHOD OF FUSING TONER IMAGES USING FUNCTIONALIZED POLYMERIC RELEASE AGENTS. JULY 18, 1978. BEL. 831662, FRA. 7523193.

Class 8A 2A

3,256,002.—XEROGRAPHIC FIXING DEVICE. JUNE 14, 1966. ADN. 0000470, AUS. 0295646, BRS. 00J3738, BRU. 0000569, CAN. 0796441, FIJ. 0000343, GHA. 0000995, GIB. 1089537, GIE. 0006669, GRB. 1089537, GUR. 1089537, HGK. 0009269, ISR. 0030229, JAP. 0537119, JER. 0000P98, KEN. 0001745, MAU. 1917571, MLS. 0015169, NIG. 0001618, NZL. 0148733, SBH. 0005369, SGP. 0008369, SHL. 0000018, SLN. 3677286, SRK. 0000386, STZ. 0458077, UGD. 0000369.
3,268,351.—XEROGRAPHIC FIXING METHOD AND APPARATUS. AUG. 23, 1966. JAP. 0489660.
3,291,466.—XEROGRAPHIC FIXING DEVICE. DEC. 13, 1966. CAN. 0800935, FRA. 1458647, GRB. 1122628, ITL. 0729649, JAP. 0524526, MEX. 0090836.
3,324,791.—XEROGRAPHIC ROLLER FUSER DRIVE APPARATUS. JUNE 13, 1967. CAN. 0825903, GRB. 1135744, JAP. 0512655, STZ. 0520889.
3,327,096.—TEMPERATURE CONTROL CIRCUIT. JUNE 20, 1967. CAN. 0797970, FRA. 1448641, GRB. 1113451, ITL. 0729649, JAP. 0572184, MEX. 0085994.
3,331,592.—XEROGRAPHIC FUSING APPARATUS. JULY 18, 1967. CAN. 0823589, JAP. 0512657, MEX. 0108575.
3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,435,500.—PRESSURE ROLL AND METHOD OF MANUFACTURING. APR. 1, 1969. ARG. 0153406, AUS. 0408490, BEL. 0670480, BRA. 0083780, CAN. 0832922, FRA. 1450156, GER. 1546792, GRB. 1124036, ITL. 0730679, JAP. 0669366, MEX. 0107366, VZL. 0024008.
3,437,032.—HEATED FUSER ROLL. APR. 8, 1969. ARG. 0155221, AUS. 0043081, BEL. 0683308, CAN. 0800936, FRA. 1484969, GRB. 1137227, ITL. 0773369, JAP. 1071499, MEX. 0093105, SPN. 0328427, STZ. 0467476, SWD. 0321410, VZL. 0023990.
3,449,548.—FUSING DEVICE. JUNE 10, 1969.
3,498,596.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0181805, AUS. 0428652, BEL. 0733408, BRA. 6909134, CAN. 0860450, CZC. 0150764, FRA. 6917085, GRB. 1258152, ITL. 0865073, MEX. 0111517, PLD. 0079991, PNM. 0002166, SPN. 0367312, STZ. 0505411, SWD. 0345329, TIW. 0006194, USR. 0230669, VZL. 0025073.
3,539,161.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIALS. NOV. 10, 1970. CAN. 0889987.
3,612,820.—HEAT FIXING APPARATUS FOR LENGTHY FUSIBLE MATERIALS. OCT. 12, 1971.
3,649,992.—CLEANING APPARATUS FOR FUSING SYSTEM. MAR. 21, 1972. CAN. 0980517, GRB. 1340684.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,690,176.—TEMPERATURE SENSING APPARATUS. SEPT. 12, 1972. GRB. 1383087.
3,718,116.—OIL DISPENSING APPARATUS. FEB. 27, 1973. CAN. 0984895.
3,745,972.—WICKING APPARATUS. JULY 17, 1973. CAN. 0991251, GRB. 1397626.
3,751,216.—FUSER ROLL ASSEMBLY. AUG. 7, 1973.
3,754,819.—APPARATUS FOR PLACING ROLLERS IN CONTACT IN A PRESSURE FUSER ASSEMBLY. AUG. 28, 1973.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOPOETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,796,183.—FREE FLOATING PRESSURE BIASING APPARATUS FOR CLEANING ROLL FUSER. MAR. 12, 1974.
3,799,401.—SILICONE OIL CAPACITY CONTROL USING POLYURETHANE BELT. MAR. 26, 1974.
3,820,591.—APPARATUS FOR SENSING DIMENSION OF SHEETS OF MATERL TO BE TRNPRTD THROUGH ELCTRSTIC REPRDCTN M. JUNE 28, 1974. CAN. 1004290.
3,831,553.—WICK FOR OIL DISPENSING APPARATUS. AUG. 27, 1974. CAN. 0984895.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,861,860.—DRY FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,881,085.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. APR. 29, 1975. BEL. 0808310, GRB. 1447679.
3,883,291.—OIL APPLICATOR FOR REPRODUCTION MACHINE FUSER. MAY 13, 1975. BEL. 0822048, FRA. 7438048, SPN. 0432090.
3,883,292.—SLEEVELESS PRESSURE ROLL CLEANER. MAY 13, 1975.
3,883,293.—PRESSURE ROLL CONSTRUCTION. MAY 13, 1975.
3,902,845.—METAL FOAM UNDER CONFORMABLE SURFACE REPLACEABLE. SEPT. 2, 1975.
3,906,800.—REUSABLE NIP MEASURING DEVICE AND METHOD. SEPT. 23, 1975.
3,907,493.—VISCO-ELASTIC DAMPENER MECHANISM FOR FUSER ASSEMBLY. SEPT. 23, 1975.
3,908,589.—STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE. SEPT. 30, 1975.
3,912,901.—PFA TEFLON SLEEVED CHOW PRESSURE ROLL. OCT. 14, 1975.
3,913,521.—COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER. OCT. 21, 1975.
3,918,397.—CONTACT FUSING APP FOR FIXING TONER IMAGES TO A SUPPORT MEMBER. NOV. 11, 1975.
3,918,804.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXNG TNR IMGS TO. NOV. 11, 1975.
3,921,573.—CLEANING SYSTEM FOR ELECTROSTATIC REPRODUCING APPARATUS. NOV. 25, 1975.
3,924,564.—FUSER APPARATUS HAVING AN ARTICULATED RELEASE MATERIAL DISPENSER. DEC. 9, 1975.
3,926,058.—CONTACT ARC REPLICATION DEVICE. DEC. 16, 1975.
3,929,094.—ROLL FUSER. DEC. 30, 1975.
3,929,095.—ROLL FUSER. DEC. 30, 1975.
3,929,096.—ROLL FUSER. DEC. 30, 1975.
3,934,113.—ROLL FUSER APPARATUS AND MOUNTING ARRANGEMENT THEREFOR. JAN. 20, 1976.
3,934,547.—RENEWABLE CHOW FUSER COATING. JAN. 27, 1976.
3,935,836.—METERING BLADE FOR A FUSER ROLL. FEB. 3, 1976.
3,938,950.—STRIPPING APPARATUS. FEB. 17, 1976.
3,940,238.—CLEANING STRUCTURE FOR AN ELASTOMERIC FUSER MEMBER. FEB. 24, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.
3,941,558.—A CONTACT AND HEATING FIXING DEVICE FOR ELECTROPHOTOGRAPHY. MAR. 2, 1976.
3,942,887.—DRIVE MECHANISM FOR A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. MAR. 9, 1976.
3,948,214.—INSTANT START FUSING APPARATUS. APR. 6, 1976.
3,951,538.—A PERMANENTLY NIPPED CONTACT IMAGE FUSER SYSTEM INCORPORATING A ONE-WAY CLUTCH. APR. 20, 1976.
3,955,916.—FUSER ROLL SHEET STRIPPING APPARATUS. MAY 11, 1976.
3,965,331.—DUAL MODE ROLL FUSER. JUNE 22, 1976.
3,965,332.—SELECTIVE FUSING APPARATUS. JUNE 22, 1976.
3,965,853.—CONTACT FUSER ASSEMBLY. JUNE 29, 1976.
3,965,973.—TEMPERATURE SENSING DEVICE. JUNE 29, 1976.
3,966,394.—PLURAL CLEANING ROLLS ASSEMBLY. JUNE 29, 1976.
3,968,343.—FUSER ROLL TEMPERATURE REGULATOR PROBE. JULY 6, 1976.
3,970,038.—ROLL FUSER. JULY 20, 1976.
3,973,844.—LATCHING MECHANISM FOR THE BACK-UP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. AUG. 10, 1976.

3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,980,423.—FUSER CLEANING ROLLER ASSEMBLY. SEPT. 14, 1976.
3,981,085.—AIR STRIPPING DEVICE FOR ELASTOMERIC SURFACE. SEPT. 21, 1976.
3,989,005.—IMPROVED OIL METERING BLADE DEVICE. NOV. 2, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,996,886.—IMPROVED OIL METERING BLADE HOLDER ASSEMBLY. DEC. 14, 1976.
3,996,887.—IMPROVED OIL METERING BLADE HOLDING DEVICE. DEC. 14, 1976.
3,999,510.—HIGH SURFACE ENERGY CLEANING ROLL. DEC. 28, 1976.
4,000,394.—FUSER THERMAL DETECTOR. DEC. 28, 1976.
4,000,957.—CONTACT FUSER AND RELEASE AGENT APPLICATOR THEREFOR. JAN. 4, 1977.
4,000,963.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. JAN. 4, 1977.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,008,955.—FUSER ASSEMBLY FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 22, 1977.
4,011,831.—IMPROVED OIL METERING BLADE LOADING ASSEMBLY. MAR. 15, 1977.
4,013,400.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. MAR. 22, 1977.
4,018,555.—CLEANING APPARATUS FOR ROLL FUSER. APR. 19, 1977.
4,025,751.—FUSER ROLL SLEEVE. MAY 24, 1977.
4,026,238.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXING TONER IMAGE. MAY 31, 1977.
4,028,050—STRIPPER FINGER COMBINATION MOUNTING MEANS THEREFOR. JUNE 7, 1977.
4,034,188.—HEAT FIXING DEVICE FOR COPYING MACHINE. JULY 5, 1977.
4,034,706.—DUAL RELEASE AGENT CU-VITON FUSER. JULY 12, 1977.
4,042,804.—ROLL FUSER APPARATUS. AUG. 16, 1977.
4,043,747.—PRESSURE HEAT FIXING DEVICE. AUG. 23, 1977.
4,045,163.—HEATED FUSER RELEASE AGENT CONTAINER. AUG. 30, 1977.
4,045,164.—USE OF SILICONE OIL AS A POLYETHYLENE OXIDATION RETARDANT IN A TONER IMAGE FUSING APPARATUS. AUG. 30, 1977. GRB. 1498469
4,047,885.—ROTATING WICK OIL DISPENSING SYSTEM. SEPT. 13, 1977.
4,050,801.—RELEASE AGENT APPLICATION SYSTEM FOR A HEATED FUSER ROLL. SEPT. 27, 1977.
4,050,803.—QUICK RELEASE MECHANISM FOR A BACKUP ROLL FUSER EMPLOYED IN A COPIER APPARATUS. SEPT. 27, 1977.
4,050,886.—ROLL FUSER. SEPT. 27, 1977. BEL. 858880.
4,052,150.—OIL WETTED FUSER ROLL STRIPPING APPARATUS. OCT. 4, 1977.
4,062,534.—STRIPPER ARRANGEMENT FOR REMOVING VARIOUS SIZED COPY SHEETS FROM FUSER ROLL. DEC. 13, 1977.
4,064,313.—HEAT FIXING MEMBER FOR ELECTROPHOTOGRAPHIC COPIERS. DEC. 20, 1977.
4,071,735.—EXTERNALLY HEATED LOW-POWER ROLL FUSER. JAN. 31, 1978.
4,075,707.—PROGRAMMED DEVICE CONTROLLER. FEB. 21, 1978.
4,079,227.—CONTACT HEAT FIXING APPARATUS FOR ELECTROPHOTOGRAPHIC REPRODUCTION MACHINES. MAR. 14, 1978.
4,079,228.—PRESSURIZED SOLVENT FUSING. MAR. 14, 1978.
4,079,229.—CONTACTING AND FIXING HEATING APPARATUS. MAR. 14, 1978.
4,080,159.—TILTING PAD STRIPPER FINGER. MAR. 21, 1978.
4,081,213.—FUSER DRIVE SYSTEM. MAR. 28, 1978.
4,082,137.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING AN ELECTROSTATOGRAPHIC MACHINE. APR. 4, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,083,092.—SLEEVED ORGANIC RUBBER PRESSSURE ROLLS. APR. 11, 1978.
4,083,322.—FUSER WICK. APR. 11, 1978.
4,085,794.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. APR. 25, 1978. BEL. 793560, CAN. 1025515, FRA. 7246728, GRB. 1418306, ITL. 973322, SWD. 7216976.
4,087,676.—FIXING APPARATUS WITH HEAT AND PRESSURE FOR ELECTROPHOTOGRAPHIC COPIERS. MAY 2, 1978.
4,101,267.—ROLL FUSER CLEANING SYSTEM. JULY 18, 1978. BEL. 846861, FRA. 7630971.

Class 8A 3

3,180,971.—XEROGRAPHIC FUSING APPARATUS. APR. 27, 1965. CAN. 0734734, GRB. 1027904, JAP. 0524355.
3,219,799.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965.
3,604,892.—FUSING APPARATUS. SEPT. 14, 1971.
3,856,460.—DEVELOPING SYSTEM FOR FILM BY ADIABACTIC HEAT FLOW. DEC. 24, 1974.

Class 8A 4

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 8B

2,684,301.—DEVICE FOR FUSING XEROGRAPHIC IMAGES. JULY 20, 1954.
2,776,907.—METHOD OF FIXING ELECTROSTATIC POWDER IMAGE. JAN. 8, 1957. CAN. 0574197.
2,922,230.—XEROGRAPHIC POWDER FIXING APPARATUS. JAN. 26, 1960.
2,995,464.—METHOD AND APPARATUS FOR FIXING XEROGRAPHIC POWDER IMAGES. AUG. 8, 1961. CAN. 0705852, FRA. 1243780, GER. 1106780, GRB. 0890911.
3,013,342.—XEROGRAPHIC FIXING APPARATUS. DEC. 19, 1961. CAN. 0616923.
3,049,810.—XEROGRAPHIC FUSING APPARATUS. AUG. 21, 1962. CAN. 0740393.
3,117,847.—XEROGRAPHIC POWDER IMAGE FIXING APPARATUS. JAN. 14, 1964.
3,132,047.—XEROGRAPHIC FIXING APPARATUS. MAY 5, 1964. AUS. 0266991, CAN. 0713996, FRA. 1332228, GER. 1571130, GRB. 1012444, JAP. 0835352.
3,148,078.—XEROGRAPHIC FUSING METHOD. SEPT. 8, 1964.
3,149,931.—XEROGRAPHIC VAPOR FUSING APPARATUS. SEPT. 22, 1964. CAN. 0758518.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,215,116.—VAPOR FUSING APPARATUS. NOV. 2, 1965.
3,704,524.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 5, 1972. ARG. 0188616, BEL. 0779806, CAN. 0950655, FRA. 7208101, GRB. 1385328, MEX. 0126261.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,934,546.—APPARATUS FOR FIXING WITH SOLVENT VAPORS. JAN. 27, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.

Class 8B 1

3,070,900.—XEROGRAPHIC FIXING APPARATUS. JAN. 1, 1963. CAN. 0686166.
3,078,589.—XEROGRAPHIC FUSING APPARATUS. FEB. 26, 1963. CAN. 0609621, GRB. 0859788.
3,140,159.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,140,160.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,199,223.—XEROGRAPHIC FUSING AND DRYING APPARATUS. AUG. 10, 1965.
3,288,624.—VAPOR FUSING METHOD FOR XEROGRAPHIC POWDER IMAGES. NOV. 29, 1966.

Class 8C

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.

3,386,822.—SOLVENT CAPSULE FIXING OF POWDER IMAGES. JUNE 4, 1968. CAN. 0712993, FRA. 1430471, GER. 1497196, GRB. 1087201, HOL. 0132775, ITL. 0745341, JAP. 0741995.
3,893,760.—TRANSFER APPARATUS. JULY 8, 1975.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
4,063,530.—IMAGE FIXING. DEC. 20, 1977.
4,072,521.—AMIDES OF W AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT. FEB. 7, 1978.
4,073,649.—DI CARBOXYLIC ACID BIS AMIDES AND IMPROVED IMAGING PROCESS. FEB. 14, 1978.
4,076,641.—W- AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS. FEB. 28, 1978.
4,099,968.—DICARBOXYLIC ACID BIS-AMIDES IN ELECTROSTATIC IMAGING COMPOSITIONS AND PROCESSES. NOV. 11, 1978.

Class 8D

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
3,493,412.—TRANSFERRING XEROGRAPHIC TONER IMAGES TO A SOLID CRYSTALLINE PLASTICIZER COATED RECEIVING SURFA. FEB. 3, 1970. CAN. 0880837, MEX. 0096609.
3,640,746.—ADHESIVE CONTACT ELECTRIFICATION IMAGING. FEB. 8, 1972.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 8E

2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721, FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,799,827.—PROCESS FOR PROTECTING THE SURFACE OF AN IMAGE. MAR. 26, 1974.
3,816,066.—XEROGRAPHIC FIXING DEVICE. JUNE 11, 1974.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,888,622.—TEMPERATURE SENSING DEVICE. JUNE 10, 1975.
3,928,656.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH PRESSURE SENSITIVE TONER. DEC. 23, 1975. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.
3,934,477.—TEMPERATURE SENSING DEVICE. JAN. 27, 1976.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
4,055,143.—RELEASE MATERIAL APPLICATION SEAL. OCT. 25, 1977.

Class 8E 1

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 9

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.
3,980,494.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. SEPT. 14, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,093,369.—CLEANING SYSTEM. JUNE 6, 1978.

Class 9A

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,552,850.—LUBRICATED BLADE CLEANING OF IMAGING PHOTOCONDUCTIVE MEMBERS. JAN. 5, 1971. ALB. 0003931, ARG. 0172544, ATR. 0300568, AUS. 0438884, BEL. 0727561, BRA. 6898275, BUR. 0000041, CAM. 0000453, CAN. 0869669, CHL. 0024409, CLB. 0017926, COR. 000947A, DNK. 0122738, EGR. 0075946, EIR. 0032784, FRA. 6902175, GNR. 0000043, GRB. 1259513, GRK. 0039239, IND. 0119582, ISR. 0031502, ITL. 0854622, LIB. P272693, LXB. 0057856, MEX. 0106799, MLG. 0003059, MLW. 00MW769, MNC. 8146975, MRC. 0014725, NOR. 0128683, NZL. 0155207, PAK. 0120897, PLD. 0017650, PLP. 0006639, PNM. 0001979, PRU. 0009588, PTG. 0051062, RHD. 5569489, SAF. 6970696, SPN. 0363130, STZ. 0493016, SWD. 0346398, TGR. 0000550, URG. 0009736, USR. 0385466, VTM. 0001840, VZL. 0023692, ZMB. 0176973.
3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.
3,717,409.—CLEANING OF ELECTROSTATOGRAPHIC SURFACES. FEB. 20, 1973.
3,724,019.—WIPER BLADE CLEANING APPARATUS FOR XEROGRAPHIC MACHINES. APR. 3, 1973. CAN. 991248.
3,724,020.—WIPER BLADE CLEANER FOR XEROGRAPHIC MACHINES. APR. 3, 1973. ARG. 0194951, BEL. 0783490, CAN. 0991249, FRA. 7216778, GER. 2220821, GRB. 1399156, ITL. 0955404, MEX. 0127875.
3,838,472.—TONER CLEANING APPARATUS. OCT. 1, 1974. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.
3,847,480.—CONTINOUS BLADE CLEANER. NOV. 12, 1974.
3,848,992.—DEVELOPER BLADE CLEANING. NOV. 19, 1974. FRA. 7415394, GRB. 1443128, ITL. 0010212.
3,848,993.—SUPPORTED DEVELOPER BLADE CLEANING. NOV. 19, 1974.
3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.
3,854,814.—TRANSLATING DWELL CLEANING SYSTEM. DEC. 17, 1974.
3,871,762.—BLADE CLEANING SYSTEM. MAR. 18, 1975.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.
3,927,937.—CLEANING ASSEMBLY FOR AN ELECTROSTATOGRAPHIC DEVICE. DEC. 23, 1975. SPN. 0420425.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.
3,950,092.—CLEANING TRANSPORTING & SORTING APPARATUS & REPRODUCING MACHINE. APR. 13, 1976.
3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.
3,973,845.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. AUG. 10, 1976.
3,977,898.—METHOD FOR CLEANING A SURFACE SUPPORT. AUG. 31, 1976. GRB. 1438660.
3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.
4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,007,982.—METHOD AND APPARATUS FOR ULTRASONICALLY CLEANING A PHOTOCONDUCTIVE SURFACE. FEB. 15, 1977.
4,030,824.—A REPRODUCING APPARATUS HAVING AN IMPROVED IMAGING SURFACE CLEANING SYSTEM. JUNE 21, 1977.
4,042,415.—METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE. AUG. 16, 1977.
4,043,659.—CLEANING BLADE TONER ARRESTOR. AUG. 23, 1977.
4,051,536.—ELECTRONIC HALFTONE IMAGING SYSTEM. SEPT. 27, 1977.
4,054,381.—TONER FILTER ARRANGEMENT. OCT. 18, 1977.
4,083,633.—BLADE CLEANING HOLDER. APR. 11, 1978.

Class 9A 1

3,099,856.—WEB CLEANER APPARATUS. AUG. 6, 1963. ARG. 0146853. CAN. 0760369, GRB. 1032957, IND. 0096310, JAP. 0481944.
3,149,356.—XEROGRAPHIC PLATE CLEANING APPARATUS. SEPT. 22, 1964.
3,186,838.—XEROGRAPHIC PLATE CLEANING METHOD UTILIZING THE RELATIVE MOVEMENT OF A CLEANING WEB. JUNE 1, 1965. CAN. 0858757, FRA. 1435510, GER. 1497242, GRB. 1094224, ITL. 0761145.
3,190,198.—XEROGRAPHIC CLEANING APPARATUS. JUNE 22, 1965.
3,337,891.—PLATE CLEANING AND TRANSPORTING APPARATUS. AUG. 29, 1967.
3,380,355.—XEROGRAPHIC CLEANING APPARATUS. APR. 30, 1968. CAN. 0819048.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.
3,526,457.—CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINES. SEPT. 1, 1970. CAN. 0880402, GRB. 1225287.
3,615,397.—METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES. OCT. 26, 1971.
3,624,858.—CLEANING APPARATUS. DEC. 7, 1971.
3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,781,107.—CLEANING APPARATUS. DEC. 25, 1973.
3,867,170.—METHOD FOR CLEANING LIQUID DEVELOPERS. FEB. 18, 1975. CAN. 0906336, GRB. 1339904.
3,879,785.—CLEANING APPARATUS. APR. 29, 1975.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,089,683.—LIQUID DEVELOPER CLEANING MEANS. MAY 16, 1978.

Class 9A 2

3,477,450.—BRUSH RECLAIMING. NOV. 11, 1969. GRB. 1206539.
3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,610,693.—METHOD OF MAKING A CYLINDRICAL BRUSH. OCT. 5, 1971. CAN. 0944415, GRB. 1332920, JAP. 0758464.
3,617,123.—XEROGRAPHIC CLEANING APPARATUS. NOV. 2, 1971.
3,634,077.—METHOD AND APPARATUS FOR REMOVING A RESIDUAL IMAGE IN AN ELECTROSTATIC COPYING SYSTEM. JAN. 11, 1972. BEL. 0737956, CAN. 0896611, FRA. 6929217, GRB. 1259960, ITL. 0870232, JAP. 0742513.
3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.
3,766,593.—CLEANING APPARATUS FOR INSULATING SURFACES. OCT. 23, 1973. ARG. 0194956, AUS. 0460978, BEL. 0784898, CAN. 0990017, FRA. 7219012, GRB. 1399900, ITL. 0960138, MEX. 0127720. SPN. 404266, STZ. 0538310, SWD. 7208414, VZL. 0032065.
3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.
3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

Class 9A 2A

2,751,616.—BRUSH CLEANING DEVICE. JUNE 26, 1956.
3,278,972.—XEROGRAPHIC PLATE CLEANING APPARATUS. OCT. 18, 1966. CAN. 0774795, FRA. 1458646, GER. 1497218, GRB. 1122624, ITL. 0729648, JAP. 0512649.
3,534,427.—CLEANING APPARATUS FOR ELECTROSTATIC PRINTING MACHINES. OCT. 20, 1970. AUS. 0425369, BEL. 0729977, CAN. 0873426, CZC. 0157666, FRA. 6907700, GRB. 1238117, HUN. 0158312, ITL. 0876795, JAP. 0645593, SPN. 0364889, SWD. 0345533, USR. 0372853.
3,590,412.—BRUSH CLEANING DEVICE FOR ELECTROSTATIC MACHINES. JULY 6, 1971. CAN. 0930107, GRB. 1248521, JAP. 0832526.
3,660,863.—CLEANING APPARATUS. MAY 9, 1972. ARG. 0188292, ATR. 0324838, AUS. 0445312, BEL. 0752937, CAN. 0925659, CHL. 0027132, DNK. 0129483, EGR. 0084130, FRA. 7024664. GRB. 1259446, GUA. 0002676, IND. 0127312, ITL. 0900201, MEX. 0115163, NOR. 0133164, NZL. 0160666, PLD. 0081341, PLP. 0007492, PNM. 0002014, PTG. 0054074, SAF. 0704533, SPN. 0381388, STZ. 0514165, SWD. 0359942, TIW. 0007784, USR. 0384250, VZL. 0032417.
3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.
3,740,789.—XEROGRAPHIC ROLLER OSCILLATING CLEANING BLADE WITH DRIVE MECHANISM THEREFOR. JUNE 26, 1973. BEL. 0789327, CAN. 0991250, FRA. 7233724, GER. 2243491, GRB. 1403440, ITL. 0967796, SWD. 7212455.
3,742,551.—TONER CLEANING AND STORAGE APPARATUS. JULY 3, 1973. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.
3,788,454.—CHAIN BEAD DRIVE APPARATUS. JAN. 29, 1974. GRB. 1430379.
3,795,025.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR CLEANING APPARATUS. MAR. 5, 1974.
3,807,853.—ELECTROPHOTOGRAPHIC CLEANING APPARATUS. APR. 30, 1974. GRB. 1439229.
4,032,228.—FOREIGN OBJECT DETECTOR BRUSH CLEANER. JUNE 28, 1977.

Class 9A 2B

2,484,782.—METHOD OF REMOVING ELECTROSCOPIC POWDER FROM AN ELECTROPHOTOGRAPHIC PLATE. OCT. 11, 1949.
2,752,271.—ELECTROSTATIC CLEANING OF XEROGRAPHIC PLATES. JUNE 26, 1956.
2,832,977.—ELECTROSTATIC CLEANING DEVICE. MAY 6, 1958.
3,404,418.—SHEET TRANSPORT APPARATUS. OCT. 8, 1968. CAN. 0859327.
3,572,923.—CLEANING METHOD AND APPARATUS FOR ELECTROSTATIC COPYING MACHINES. MAR. 30, 1971. ARG. 0172603, AUS. 0429490, BEL. 0737957, CAN. 0884822, FRA. 6929174, GRB. 1259890, ITL. 0870233, JAP. 0819708, MEX. 0113040, SPN. 0370878, SWD. 0348851.
3,655,373.—CLEANING METHOD FOR ELECTROSTATIC COPYING MACHINE. APR. 11, 1972.
3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.
3,722,018.—CLEANING APPARATUS. MAR. 27, 1973.
3,738,745.—FUR BRUSH ERASER. JUNE 12, 1973. CAN. 0970554, GRB. 1418036.

Class 9A 2B 1

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.
3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

Class 9A 2C

3,252,274.—XEROGRAPHIC POWDER FILTER. MAY 24, 1966. CAN. 0712876, GER. 1278245, GRB. 1031634, JAP. 0502993.
3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,641,979.—TONER RECLAIMING SYSTEM. FEB. 15, 1972. CAN. 0913351.
3,793,986.—TONER RECLAIMING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. FEB. 26, 1974. ARG. 0194370, AUS. 0464194, BEL. 0784636, GER.

0978341, GRB. 1373721, ITL. 0956416, MEX. 0128265, SPN. 403.704, STZ. 0546970, VZL. 0033339.

3,816,157.—TONER RECLAIMING METHOD. JUNE 11, 1974.

4,046,682.—TONER RECLAIMING SYSTEM. SEPT. 6, 1977. CAN. 1030209.

Class 9B

2,772,991.—PROCESS OF CLEANING A RESIDUAL POWDER IMAGE FROM AN ELECTROPHOTOGRAPHIC PLATE. DEC. 4, 1956.

2,874,064.—XEROGRAPHIC CLEANER. FEB. 17, 1959.

3,332,328.—XEROGRAPHIC DEVELOPER SEAL AND PROCESS. JULY 25, 1967. CAN. 0792684, GRB. 1138394, JAP. 0512658, MEX. 0091318.

3,607,160.—LIGRCIN CONTAINING PUMICING COMPOSITION. SEPT. 21, 1971.

3,610,749.—IMAGING SYSTEM. OCT. 5, 1971. CAN. 0923541, GRB. 1339905, JAP. 0745767.

3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.

3,834,804.—COPYING MACHINE WITH MEANS FOR MOUNTING CARRIER BEAD PICKOFF ROLLER THEREIN. SEPT. 10, 1974.

4,026,701.—GAS IMPINGMENT & SUCTION CLEANING APPARATUS. MAY 31, 1977.

Class 9B 1

2,911,330.—MAGNETIC BRUSH CLEANING. NOV. 3, 1959.

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

Class 9B 2

RE.28,566.—CLEANING APPARATUS. OCT. 7, 1975. CAN. 0913310, MEX. 0113698.

3,424,615.—METHOD AND APPARATUS FOR CLEANING XEROGRAPHIC PLATES. JAN. 28, 1969. CAN. 0842022, GRB. 1158521, JAP. 0561239.

3,580,673.—CLEANING APPARATUS-REISSUED AS RE28566-D2266R. MAY 25, 1971. CAN. 0913310, MEX. 0113698.

3,615,398.—METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING PHOTOCONDUCTV SRFACE. OCT. 26, 1971.

3,625,683.—PROCESS FOR CLEANING A PHOTO-CONDUCTIVE DRUM OF RESIDUAL TONER PARTICLES AND REUSE OF THE SAME. DEC. 7, 1971. CAN. 0937800, GRB. 1329982.

3,628,950.—METHOD OF REMOVING THE RESIDUAL TONER PARTICLES FROM A PHOTOCONDUCTIVE SURFACE. DEC. 21, 1971.

3,640,707.—IMAGING SYSTEM. FEB. 8, 1972.

3,655,375.—INTERMITTENT GRIT REMOVAL PROCESS. APR. 11, 1972. CAN. 0924493, GRB. 1341404, JAP. 0746926.

3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.

3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 9B 3

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

3,483,034.—PROCESS OF CLEANING XEROGRAPHIC PLATES. DEC. 9, 1969. CAN. 0800825, FRA. 1463257, GER. 1497235, GRB. 1125594, ITL. 0750154.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.

3,702,303.—CLEANING OF PHOTOCONDUCTIVE INSULATING SURFACES. NOV. 7, 1972. CAN. 0944650, GRB. 1369451.

3,762,950.—CLEANING OF PARTICLES FROM A SURFACE. OCT. 2, 1973. ARG. 0195076, AUS. 0464713, BEL. 7916681, CAN. 0974009, FRA. 7241538, GRB. 1400238, ITL. 0971072, MEX. 0128580, SPN. 0408837, STZ. 0553433, SWD. 7215089, VZL. 0032005.

3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.

3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

3,937,665.—PHOTORECEPTOR SOLVENT CLEANER. FEB. 10, 1976.

3,979,317.—VOLATILE CLEANING SOLUTION FOR PHOTORECEPTOR. SEPT. 7, 1976.

4,054,534.—VOLATILE CLEANING SOLUTION FOR MIRRORS AND LENSES. OCT. 18, 1977.

Class 10

3,945,728.—AN ALARM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 23, 1976.

4,089,515.—DOCUMENT STORAGE AND TRANSPORT APPARATUS. MAY 16, 1978. BEL. 850379.

Class 10A

RE29,406.—DOCUMENT ORIGINAL HANDLING SYSTEM. SEPT. 20, 1977. FRA. 7442405.

D.230,085.—COPY PAPER CASSETTE. JAN. 22, 1974.

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

2,822,172.—SHEET HANDLING MACHINE. FEB. 4, 1958. CAN. 0570493.

3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.

3,152,528.—DOCUMENT CARRIER. OCT. 13, 1964. CAN. 0707048, FRA. 1414049, GER. 1197744, GRB. 1032954, ITL. 0737307, JAP. 0471310.

3,220,275.—DOCUMENT DRIVE TRANSMISSION. NOV. 30, 1965.

3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.

3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.

3,326,548.—CARD CONVEYING APPARATUS HAVING A ROTARY FRONT GAUGE. JUNE 20, 1967. CAN. 0793702, MEX. 0086197.

3,370,844.—CARD HANDLING-SCANNING DEVICE. FEB. 27, 1968.

3,409,356.—CONVEYOR FOR DOCUMENTS. NOV. 5, 1968. FRA. 1500227, GRB. 1162982, ITL. 0776597.

3,409,357.—APPARATUS FOR AN ELECTROSTATIC MACHINE. NOV. 5, 1968. CAN. 0816416, GRB. 1151104, JAP. 0542588.

3,419,264.—DOCUMENT HANDLING SYSTEM. DEC. 31, 1968. ARG. 0168399, CAN. 0831413, CHL. 0024536, JAM. 0002459, MEX. 0101167, PRU. 0009340, URG. 0009205, VZL. 0023735.

3,424,528.—DOCUMENT CONVEYOR UNIT. JAN. 28, 1969. CAN. 0842644, GRB. 1175596.

3,446,554.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 27, 1969. ARG. 0171943, ATR. 0302040, AUS. 0451715, BEL. 0708649, CAN. 0880187, FRA. 1567148, GRB. 1223426, HUN. 0158170, ITL. 0823019, JAP. 0657008, LXB. 0055166, MEX. 0101029, NOR. 0127833, PLD. 0069795, SPN. 0348801, STZ. 0485581, SWD. 0354529, USR. 0259733, VZL. 0023685.

3,504,908.—DOCUMENT FEEDING APPARATUS CONTROL. APR. 7, 1970.

3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.

3,578,316.—DRIVING APPARATUS FOR ARTICLE FEEDERS. MAY 11, 1971. CAN. 0907653.

3,614,090.—DOCUMENT CONVEYOR. OCT. 19, 1971. ARG. 0183554, AUS. 0451766, BEL. 0751308, CAN. 0922330, EGR. 0081784, FRA. 7019911, GRB. 1311766, ITL. 0893688, MEX. 0118182, SPN. 0380271, STZ. 0512751, SWD. 0362150, TIW. 0007678, USR. 0349152, VZL. 0032780.

3,628,408.—STAMP DISPENSER. DEC. 21, 1971. CAN. 0931918, GRB. 1324699, JAP. 0755787.

3,628,786.—DOCUMENT HANDLING APPARATUS. DEC. 21, 1971. CAN. 0942552, GRB. 1329989.

3,630,515.—DOCUMENT HANDLING APPARATUS. DEC. 28, 1971.

3,630,519.—DOCUMENT FEED APPARATUS. DEC. 28, 1971. CAN. 0903779, GRB. 1329747.
3,649,447.—APPARATUS FOR DECURLING A PAPER WEB. MAR. 14, 1972. CAN. 0916185, GRB. 1288846.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,804,514.—DUAL FUNCTION DOCUMENT STOP FOR A COPYING DEVICE. APR. 16, 1974. FRA. 7334456, GRB. 1424060.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,860,339.—COPYING MACHINE. JAN. 14, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.
3,874,651.—REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER. APR. 1, 1975. GRB. 1467791.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,885,782.—SHEET FEEDER. MAY 27, 1975. CAN. 3885782.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,889,943.—PLATEN TRANSPORT FOR AUTOMATIC DOCUMENT HANDLER. JUNE 17, 1975.
3,900,258.—EXPOSURE APPARATUS. AUG. 19, 1975. AUS. 0474469, CAN. 1004724, GRB. 1424242, ITL. 0993030, SPN. 0418138, SWD. 7311579.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,909,129.—DOCUMENT FEEDING APPARATUS. SEPT. 30, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,941,376.—AUTOMATIC DOCUMENT HANDLER-ARDRI ADH PLATEN TRANSPORT MOUNTING. MAR. 2, 1976. BEL. 0799234, CAN. 0993906, FRA. 7316540, GRB. 1421427, ITL. 0987317, SPN. 0414541.
3,941,473.—MANUAL ASSIST DOCUMENT FEEDER. MAR. 2, 1976.
3,944,365.—DOCUMENT FEEDING APPARATUS AND LATCHING MECHANISM. MAR. 16, 1976.
3,944,794.—COPYING SYSTEM CONTROL. MAR. 16, 1976. ARG. 0204710, BEL. 0808230, CAN. 1007289, FRA. 7343289, GRB. 1450707, ITL. 1002162, MEX. 0135679, SPN. 0421150, STZ. 0577391, USR. 0543364.
3,947,111.—DOCUMENT FEEDING APPARATUS. MAR. 30, 1976.
3,953,122.—DOCUMENT ORIGINAL HANDLING SYSTEM. APR. 27, 1976.
3,954,259.—DOUBLE BAR SEPARATOR FOR A SHEET RECEIVING TRAY. MAY 4, 1976.
3,959,573.—COMPOSITIONS AND METHODS FOR MAKING BIASABLE MEMBERS. MAY 25, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
3,982,832.—ELECTROSTATOGRAPHIC COPYING MACHINES. SEPT. 28, 1976.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,988,065.—REFLECTIVE DOCUMENT FEEDER. OCT. 26, 1976.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,000,943.—DUAL PURPOSE DOCUMENT HANDLING SYSTEM. JAN. 4, 1977. BEL. 0837235.
4,004,941.—CLEANING METHOD FOR AUTOMATIC DOCUMENT HANDLER. JAN. 25, 1977.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.
4,017,172.—DOCUMENT FEEDING APPARATUS. APR. 12, 1977.
4,018,523.—REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT. APR. 19, 1977. BEL. 0842928.
4,030,721.—AUTOMATIC MANUSCRIPT DISCHARGING DEVICE FOR COPYING MACHINES. JUNE 21, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.
4,034,869.—FLUID MEANS TO LOAD AND UNLOAD A VERTICALLY MOVABLE DOCUMENT STORAGE RACK. JULY 12, 1977.
4,040,615.—ORIGINAL DISCHARGING DEVICE FOR COPIERS. AUG. 9, 1977.
4,043,550.—IMPROVED REGISTRATION MEANS FOR AUTOMATIC DOCUMENT HANDLING APPARATUS. AUG. 23, 1977. BEL. 847626, FRA. 7631994, SPN. 452660.
4,043,664.—INTERLINEAR FEEDER FOR COPYING MACHINE. AUG. 23, 1977.
4,043,665.—COPIER DOCUMENT HANDLER. AUG. 23, 1977.
4,047,812.—DOCUMENT BELT WITH IMPERFORATE BANDS. SEPT. 13, 1977. GER. 7700998.
4,049,255.—APPARATUS FOR FEEDING DOCUMENTS TO AND FROM A COPIER. SEPT. 20, 1977. FRA. 7706823.
4,050,751.—DOCUMENT CAROUSEL. SEPT. 27, 1977.
4,050,816.—DOCUMENT HANDLING SYSTEM. SEPT. 27, 1977. BEL. 839792, SPN. 445641.
4,053,224.—DOCUMENT HANDLING SYSTEM. OCT. 11, 1977.
4,059,260.—DOCUMENT HANDLING APPARATUS. NOV. 22, 1977.
4,062,538.—SPEED REGULATED FLUIDIC SHEET TRANSPORT. DEC. 13, 1977. BEL. 850380.
4,078,786.—AUTOMATIC DOCUMENT RECIRCULATION SYSTEM. MAR. 14, 1978.
4,079,876.—COMPUTER FORMS FEEDER. MAR. 21, 1978.
4,080,063.—COPIER DOCUMENT HANDLING SYSTEM. MAR. 21, 1978.
4,086,007.—DUAL PURPOSE DOCUMENT AND COPY SHEET FEED CASSETTE. APR. 25, 1978.
4,087,172.—DOCUMENT HANDLING APPARATUS. MAY 2, 1978.
4,093,372.—PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM. JUNE 6, 1978.
4,097,146.—ORIGINAL HANDLING SYSTEM AND PROCESS. JUNE 27, 1978.
4,099,810.—UPRIGHT DOCUMENT CAROUSEL. JULY 11, 1978.

Class 10B

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,139,279.—RECORD CARD MAGAZINE. JUNE 30, 1964. CAN. 0717868.
3,180,637.—RECORD CARD FEEDING APPARATUS. APR. 27, 1965. CAN. 0806932.
3,357,574.—SEQUENTIAL CONTROL SYSTEM. DEC. 12, 1967. CAN. 0824898.
3,383,105.—CARD PICK-OFF APPARATUS. MAY 14, 1968. CAN. 0820743, GRB. 1193512, JAP. 0610154.
3,482,917.—CARD TRANSPORT APPARATUS. DEC. 9, 1969. CAN. 0842646, GRB. 1193516.
3,784,303.—AUTOMATIC MICROFICHE COPIER. JAN. 8, 1974. CAN. 1000779, GRB. 1412221.
4,095,732.—METHOD AND APPARATUS FOR ACCURATELY CONTROLLING THE POSITION OF A FILM TRANSPORT DEVICE. JUNE 20, 1978.

Class 10C

2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,506,257.—DOCUMENT FEEDING APPARATUS. APR. 14, 1970. CAN. 0885333, GRB. 1253416.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,861,671.—LIFTABLE BAIL BAR FOR ALLOWING RETURN OF MULTIPLY SEPARATED SHEETS TO STACK. JAN. 21, 1975.
3,895,790.—MOVABLE BAIL BAR. JULY 22, 1975. BEL. 0815050, CAN. 1009267.
3,936,180.—XEROGRAPHIC APPARATUS WITH SAMPLE PRINT CAPABILITIES. FEB. 3, 1976. BEL. 0809398, ITL. 1006708.
3,968,364.—HEIGHT SENSING DEVICE. JULY 6, 1976.
3,993,300.—AUTOMATIC FEEDER FOR COMPOSITE COPYING. NOV. 23, 1976. BEL. 0815215 GRB. 1467996, STZ. 0561917.
4,025,068.—SHEET FEEDER. MAY 24, 1977.
4,054,284.—PAPER-ANTI-SKEW DEVICE. OCT. 18, 1977.

Class 10D

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,581,000.—INCREMENTAL STEPPING PAPER DRIVE. MAY 25, 1971.
3,618,123.—FACSIMILE DRUM CONVEYOR. NOV. 2, 1971. ARG. 0181314, BEL. 0743659, CAN. 0918186, FRA. 6944287, GER. 1963786, GRB. 1280340, ITL. 0880304, JAP. 0852728, MEX. 0122967, SPN. 0374915, SWD. 0363457, VZL. 0025438.
3,790,159.—AUTOMATIC DOCUMENT HANDLING DEVICE. FEB. 5, 1974. CAN. 1013377, GRB. 1417793.
3,815,899.—SHEET DELIVERY DEVICE. JUNE 11, 1974. CAN. 0994377, FRA. 7409303, GRB. 1456422.
3,854,715.—CAM. DEC. 17, 1974. CAN. 1007256, GRB. 1456576.

Class 10E

3,288,459.—DOCUMENT FEEDING APPARATUS. NOV. 29, 1966. CAN. 0788345, JAP. 0632541, MEX. 0086958.
3,300,208.—COPY POSITIONING APPARATUS AND METHOD. JAN. 24, 1967. CAN. 0817270, JAP. 0605646, MEX. 0090842.
3,473,035.—DOCUMENT TRANSPORT AND REGISTRATION SYS USING PHOTOCELLS. OCT. 14, 1969. ARG. 0170131, CAN. 0858983, CHL. 0024005, JAM. 0001926, MEX. 0101674, PRU. 0009301, URG. 0009238, VZL. 0023677.
3,510,125.—DOCUMENT REGISTRATION SYSTEM. MAY 5, 1970. BEL. 0726865, CAN. 0897195, FRA. 2000318, GER. 1902112, GRB. 1253417, ITL. 0854755, JAP. 0783473.
3,558,223.—DOCUMENT CENTERING APPARATUS. JAN. 26, 1971.
3,630,611.—DOCUMENT REGISTRATION APPARATUS. DEC. 28, 1971.
3,630,620.—PLATEN COVER FOR COPYING MACHINES. DEC. 28, 1971. CAN. 0921307, GRB. 1309313.
3,642,370.—DOCUMENT PRESENTATION DEVICE. FEB. 15, 1972. GRB. 1206633.
3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.
3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973.
3,829,082.—AUTOMATIC DOCUMENT HANDLER. AUG. 13, 1974. CAN. 0986958, GRB. 1421425.
3,854,715.—CAM. DEC. 17, 1974, CAN. 1007256, GRB. 1456576.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975. CAN. 1004240.
3,877,804.—CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER. APR. 15, 1975.
3,883,134.—DETECTING AND REMOVING APPARATUS FOR SKEW FED SHEETS. MAY 13, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,990,794.—COPYING MACHINE. NOV. 9, 1976. STZ. 0587508.
4,026,542.—DUAL REGISTRATION APPARATUS. MAY 31, 1977.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,574.—DOCUMENT HANDLING APPARATUS. JULY 5, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.
4,043,550.—IMPROVED REGISTRATION MEANS FOR AUTOMATIC DOCUMENT HANDLING APPARATUS. AUG. 23, 1977. BEL. 847626, FRA. 7631994, SPN. 452660.
4,043,665.—COPIER DOCUMENT HANDLER. AUG. 23, 1977.
4,047,812.—DOCUMENT BELT WITH IMPERFORATE BANDS. SEPT. 13, 1977. GER. 7700998.
4,050,688.—ORTHOGONAL DOCUMENT HANDLING APPARATUS. SEPT. 27, 1977.
4,054,285.—APPARATUS FOR REGISTERING AND INVERTING SHEETS. OCT. 18, 1977.
4,055,340.—ASSISTED PNEUMATIC TRANSPORT AND REGISTRATION APPARATUS. OCT. 25, 1977. BEL. 848823.
4,062,538.—SPEED REGULATED FLUIDIC SHEET TRANSPORT. DEC. 13, 1977. BEL. 850380.
4,066,254.—THREE-WAY PNEUMATIC REGISTRATION APPARATUS. JAN. 3, 1978.
4,073,001.—APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET. FEB. 7, 1978.
4,076,233.—DOCUMENT HANDLING APPARATUS. FEB. 28, 1978. BEL. 847625, FRA. 7631999, SPN. 452661.
4,090,704.—REGISTRATION STATION. MAY 23, 1978.
4,097,146.—ORIGINAL HANDLING SYSTEM AND PROCESS. JUNE 27, 1978.

Class 10F

3,288,464.—CARD INVERTING APPARATUS. NOV. 29, 1966. CAN. 0803316, JAP. 0547200.
3,408,140.—DOCUMENT HANDLING APPARATUS. OCT. 29, 1968. CAN. 0842643, GRB. 1143062.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246, GRB. 1445854.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
3,980,406.—DUPLEX IMAGING SYSTEM. SEPT. 14, 1976.
4,040,616.—SHEET TURN AROUND INVERTER. AUG. 9, 1977. FRA. 7701111.
4,054,285.—APPARATUS FOR REGISTERING AND INVERTING SHEETS. OCT. 18, 1977.
4,089,515.—DOCUMENT STORAGE AND TRANSPORT APPARATUS. MAY 16, 1978. BEL. 850379.

Class 10G

2,889,029.—LABEL APPLYING MACHINE. JUNE 2, 1959.
2,925,167.—CONVEYOR FOR ARTICLES IN IMBRICATING. FEB. 16, 1960.
3,419,265.—DOCUMENT STACKER APPARATUS. DEC. 31, 1968. ARG. 0171423, CAN. 0833415, CHL. 0024006, JAM. 0001859, MEX. 0100967, PRU. 0001930, URG. 0009140, VZL. 0023736.
3,460,825.—FAN FOLD STACKING APPARATUS. AUG. 12, 1969. CAN. 0855586, GRB. 1205418.
3,497,207.—SORTING APPARATUS FOR DOCUMENTS. FEB. 24, 1970. BEL. 0727203, CAN. 0895731, FRA. 6900957, GRB. 1245841, HOL. 0148006, ITL. 0854588.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,729,188.—DOCUMENT STACKER APPARATUS. APR. 24, 1973. CAN. 1000311, FRA. 0701711, GRB. 1303165, ITL. 0893040.
3,865,480.—ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING. FEB. 11, 1975.
4,017,066.—SET SEPARATOR. APR. 12, 1977.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,093,372.—PRE-SEPARATED RECIRCULATING DOCUMENT COPYING SYSTEM. JUNE 6, 1978.

Class 10H

3,467,371.—SHEET DISTRIBUTOR. SEPT. 16, 1969. ARG. 0168293, ATR. 0294140, AUS. 0423257, BEL. 0702898, CAN. 0925803, CHL. 0023102, CLB. 0017542, DNK. 0124250, EIR. 0031306, FIN. 0047869, FRA. 1541084, GRB. 1193513, GRK. 0038675, IND. 0112000, ISR. 0028519, ITL. 0813836, JAP. 0645588, LXB. 0054335, MEX. 0099952, NOR. 0124920, NZL. 0149788, PAK. 0118964, PLP. 0006507, PRU. 0009477, PTG. 0048210, SAF. 0674986, SPN. 0344349, STZ. 0480253, SWD. 0337384, TRK. 0015492, URG. 0008974, VZL. 0026276.
3,815,896.—AUTOMATIC DOCUMENT HANDLER. JUNE 11, 1974. BEL. 0797889, CAN. 0984863, FRA. 7316287, GRB. 1421426, ITL. 0987316, SPN. 0414486.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,907,277.—METHOD AND DEVICE FOR REMOVING DOCUMENTS FROM A PLATEN. SEPT. 23, 1975.
3,913,467.—COLLATING APPARATUS. OCT. 21, 1975.
3,944,207.—LIMITLESS SORTER. MAR. 16, 1976.
3,944,366.—SLIDING PLATEN COVER APPARATUS. MAR. 16, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976. BEL. 0839792, SPN. 0445641.

3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.
4,050,816.—DOCUMENT HANDLING SYSTEM. SEPT. 27, 1977. BEL. 839792, SPN. 445641.

Class 101

3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,609,737.—METHOD AND APPARATUS FOR ARTICLE DETECTION UTILIZING CORONA DISCHARG. SEPT. 28, 1971. CAN. 0872468, GER. 1932248, GRB. 1259998, JAP. 0657911.
3,672,760.—XEROGRAPHIC PLATE TRANSPORTING MECHANISM. JUNE 27, 1972. CAN. 0939555, GRB. 1359888.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
3,744,047.—SUPERPOSED SHEET DETECTION. JULY 3, 1973. CAN. 0985762, FRA. 7231694, GRB. 1396560, ITL. 0967501.
3,748,088.—FUSER CONTROL APPARATUS. JULY 24, 1973.
3,778,618.—PHOTODETECTION OF NON-OPAQUE OBJECTS TRANSPRTD ALONG A CONVEYOR BY USE OF A LIGHT BLCKING OPAQU. DEC. 11, 1973. GRB. 1406170.
3,790,158.—AUTOMATIC DOCUMENT HANDLER. FEB. 5, 1974. GRB. 1421428.
3,894,513.—COPYING MACHINE WITH BEAD PICKOFF ROLLER. JULY 15, 1975. FRA. 7342586, GRB. 1441288.
3,945,546.—ZIG ZAG FOLDED STRIP BOTTOM FEEDER. MAR. 23, 1976.

Class 12

4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 12A

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.
3,384,565.—PROCESS OF PHOTOELECTROPHORETIC COLOR IMAGING. MAY 21, 1968. ARG. 0149921, ATR. 0304268, AUS. 0414156, BEL. 0667116, BRA. 0087920, CAN. 0867678, CHL. 0021697, CLB. 0014706, FRA. 1450843, GER. 1497243, GRB. 1124626, GRK. 0030605, IND. 0119647, ISR. 0023973, ITL. 0744030, JAP. 681941, LXB. 0049058, MEX. 0091899, NOR. 0128733, NZL. 0142323, PPU. 0009538, PTG. 0044324, SAF. 653922, SPN. 0321858, STZ. 0481409, SWD. 6509579, URG. 0009540. VZL. 0017273.
3,384,566.—METHOD OF PHOTOELECTROPHORETIC IMAGING. MAY 21, 1968.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973. CAN. 1003025.
3,759,611.—MICROIMAGE RANSOM ACCESS AND RETRIEVAL PRINTER. SEPT. 18, 1973. CAN. 0987156, GRB. 1427017.

Class 12B

3,383,993.—PHOTOELECTROPHORETIC IMAGING APPARATUS. MAY 21, 1968. ARG. 0165160, AUS. 0419734, BEL. 0692048, CAN. 0866143, FRA. 1507051, GRB. 1158301, GRK. 0033285, HOL. 0150926, ITL. 0862555, LXB. 0052738, MEX. 0096357, PTG. 0044324, SAF. 0067022, SPN. 0335121, STZ. 0510901, VZL. 0024450.
3,610,748.—PHOTOELECTROPHORETIC IMAGING SYSTEM. OCT. 5, 1971. BEL. 0752438, CAN. 0922569, FRA. 7023045, GRB. 1319532, ITL. 0894621, JAP. 0739527.
3,656,847.—ELEVATOR MECHANISM. APR. 18, 1972.
3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.
3,697,409.—BELT ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. ARG. 0183572, BEL. 0760077, BRA. 7023343, CAN. 0937803, FRA. 7045072, GRB. 1339734, ITL. 0913368, JAP. 0752721, MEX. 0119368, VZL. 0032930.
3,844,779.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A BELT ELECTRODE. OCT. 29, 1974.
4,043,654.—DISPLAY SYSTEM. AUG. 23, 1977.
4,043,655.—PHOTOELECTROPHORETIC IMAGING REPRO- DUCTION DEVICE. AUG. 23, 1977.

Class 12C

3,427,242.—APPARATUS FOR CONTINUOUS PHOTOELECTROPHORETIC IMAGING. FEB. 11, 1969. BEL. 0743902, CAN. 0851701, FRA. 1521727, GER. 1572385, GRB. 1185932, ITL. 0794269, JAP. 0580245, MEX. 0097005.
3,474,019.—PHOTOELECTROPHORETIC IMAGING MTD INC. CONTACTNG IMGNG SUSPNSN W/ ALG SFC OF FLEXIBLE ELECTRODE. OCT. 21, 1969. AUS. 0418224, BEL. 0692912, BRA. 6678842, CAN. 0834679, GRK. 0033301, LXB. 0052730, MEX. 0090286, PTG. 0046984, SAF. 0670024, SPN. 0335454.
3,551,320.—IMAGING APPARATUS. DEC. 29, 1970.
3,600,081.—IMAGING APPARATUS. AUG. 17, 1971. ARG. 0192211, ATR. 0324839, AUS. 0455820, BEL. 0758903, CAN. 0936732, CZC. 0164288, EGR. 0090482. FRA. 7041652, GRB. 1335990, ITL. 0909307, JAP. 0751878, MEX. 0122272, PNM. 0002094, SPN. 0385453, STZ. 0518582, SWD. 0362717, TIW. 0008461, USR. 0412697, VZL. 0032926.
3,609,028.—IMAGING APPARATUS. SEPT. 28, 1971. ARG. 0186570, ATR. 0319749, AUS. 0455572, BEL. 0758806, CAN. 0935012, EGR. 0086977, FRA. 7041648, GRB. 1335988, ITL. 0909306, MEX. 0121331, PLD. 0082852, PNM. 0002167, SPN. 0385452, STZ. 0518580, SWD. 0361753, TIW. 0007385, USR. 0465806, VZL. 30683.
3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.
3,642,365.—AUTOMATED IMAGING MACHINE. FEB. 15, 1972. ARG. 0183571, ATR. 0324123, AUS. 0456428, BEL. 0758902, CAN. 0937440, EGR. 0091986, FRA. 7041647, GRB. 1337145, ITL. 0909311, JAP. 0758463, MEX. 0120289, PLD. 0082861, PNM. 0002255, SPN. 0385457. STZ. 0544327, SWD. 0367493, TIW. 0007386.
3,642,606.—APPARATUS FOR IMAGE FORMATION ON THE INSIDE OF A CYLINDER. FEB. 15, 1972. ARG. 0183573, BEL. 0760749, BRA. 7022094, CAN. 0938490, FRA. 7047632, GRB. 1339578, ITL. 0913902, JAP. 0752722, MEX. 0119589, VZL. 0032929.
3,644,035.—FLAT PLATE TRAVELING ROLLER IMAGING. FEB. 22, 1972. ARG. 0183670, AUS. 0456429, BEL. 0758904, BRA. 7023406, CAN. 0923356, EGR. 0090280, FRA. 7041653, GRB. 1335051, ITL. 0909308, JAP. 0751879, MEX. 0119530, PLD. 0082860, SPN. 0385454, STZ. 0528763, SWD. 0367074, TIW. 0008460, USR. 0404290, VZL. 30682.
3,645,616.—PHOTOELECTROPHORETIC IMAGE TRANSFER APPARATUS. FEB. 29, 1972. CAN. 0949049, GRB. 1337417, JAP. 783768.
3,647,290.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 7, 1972. ARG. 0184762, AUS. 0454820, BEL. 0058902, CAN. 0939954, EGR. 0090483, FRA. 7061651, GER. 1337416, GRB. 1337416, ITL. 0909312, JAP. 0751880, MEX. 0119752, SPN. 0385458, STZ. 0530662, SWD. 0366850, TIW. 0007384, USR. 0419062, VZL. 30685.
3,667,842.—IMAGING APPARATUS. JUNE 6, 1972. ARG. 0193347, BEL. 0768538, CAN. 0953559, FRA. 7122750, GRB. 1350395, ITL. 0927384, MEX. 0123298.
3,703,335.—MULTIPLE EXPOSURE IMAGING APPARATUS. NOV. 21, 1972. BEL. 0760457, CAN. 0968605, FRA. 7047141, GRB. 1339550, ITL. 0913636, JAP. 0759479.
3,719,484.—PHOTOELECTROPHORETIC IMAGING METHOD. MAR. 6, 1973. CAN. 0957890, GRB. 1369701.
3,728,018.—IMAGING APPARATUS. APR. 17, 1973. CAN. 0924156, GRB. 1335697.
3,800,743.—MATERIALS APPLICATION APPARATUS. APR. 2, 1974.
3,860,336.—PHOTOELECTROPHORETIC IMAGING MACHINE AND APPTS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACT. JAN. 14, 1975.
3,860,337.—MULTIPLE EXPOSURE METHOD AND APPARATUS. JAN. 14, 1975. CAN. 0957890, GRB. 1369701.

3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.
4,006,982.—PHOTOELECTROPHORETIC CONCURRENT PROCESS CYCLING. FEB. 8, 1977. BEL. 0841077.
4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.
4,066,452.—VELOCITY COMPENSATION FOR BEAD BYPASS. JAN. 3, 1978.
4,084,896.—PHOTOELECTROPHORETIC WEB IMAGING APPARATUS. APR. 18, 1978. BEL. 841077, FRA. 7612178.

Class 12D

3,448,025.—PHOTOELECTROPHORETIC IMAGING SYSTEM UTILIZING A PROGRAMMED POTENTIAL APPLICATION. JUNE 3, 1969. ARG. 0167580, AUS. 0417981. BEL. 0719188, CAN. 0875492, FRA. 0095530, GER. 1797123, GRB. 1149666, ITL. 0890086, MEX. 0100805, VZL. 0025946.
3,485,738.—PHOTOELECTROPHORETIC IMG PROCESS EMPLOYNG LAYER OF INSULATNG LIQUID TO IMPROVE IMAGE QUALITY. DEC. 23, 1969. AUS. 0431891, BEL. 0743640, CAN. 0850591, GER. 1522751, GRB. 1174831, JAP. 0578397.
3,565,614.—IMAGE TRANSFER. FEB. 23, 1971. ARG. 0157773, AUS. 0413930, BEL. 0696853, CAN. 0890362, FRA. 1520919, GER. 1572384, GRB. 1185931, ITL. 0801198, JAP. 0586922, MEX. 0099070, SPN. 0349966, STZ. 0482230, SWD. 0332754, VZL. 0024013.
3,582,205.—IMAGING APPARATUS. JUNE 1, 1971.
3,616,398.—PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE. OCT. 26, 1971.
3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.
3,697,407.—PREVENTION OF ARCING IN AN ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. CAN. 0884225, GRB. 1309127, JAP. 0731608.
3,697,408.—IMAGING SYSTEM. OCT. 10, 1972. CAN. 0890361, GRB. 1312733, JAP. 0731610.
3,708,286.—PHOTOELECTROPHORETIC IMAGING WITH ULTRASONIC VIBRATION DURING IMAGING. JAN. 2, 1973. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.
3,853,556.—METHOD FOR ELIMINATING ELECTRICAL ARCING DURING PHOTOELECTROPHORETIC IMAGING. DEC. 10, 1974.

Class 12E

3,535,221.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING A PHOTOCONDUCTOR COATING FOR THE BLOCKING ELECTRO. OCT. 20, 1970. ARG. 0176485, AUS. 0448560, BEL. 0722301, CAN. 0891971, FRA. 1587938, GER. 1802988, GRB. 1236619, ITL. 0845022, JAP. 0693378, MEX. 0108364, VZL. 0023742.
3,595,771.—METHOD OF REMOVING ACCUMULATED CHARGES IN PHOTOELECTROPHORETIC IMAGING. JULY 27, 1971. ARG. 0198476, ATR. 0302041, AUS. 0448837, BEL. 0737549, CAN. 0922955, FRA. 6927969, GER. 1941463, GRB. 1267255, ITL. 0869935, JAP. 0704156, SWD. 0341726.
3,639,224.—PHOTOELECTROPHORETIC IMAGING SYSTEM. FEB. 1, 1972. CAN. 0922568, GRB. 1313683, JAP. 0739526.
3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.
3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.
3,775,107.—IMAGING SYSTEM. NOV. 27, 1973.
3,859,576.—HIGH PERFORMANCE BLOCKING ELECTRODE FOR ELECTROPHOTOPHORESIS. JAN. 7, 1975. BEL. 0810802, ITL. 1006354.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.
3,956,524.—METHOD FOR THE PREPARATION OF ELECTROSTATOGRAPHIC AND PHOTORECEPTORS. MAY 11, 1976.
3,966,466.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DARK CHARGE INJECTING AGENT ON BLOCKING ELECTRODE. JUNE 29, 1976.
3,967,961.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A DARK CHARGE INJECTING AGENT-AKLYD RESIN COATING. JULY 6, 1976.
3,980,477.—PHOTOELECTROPHORESIS WITH DARK CHARGE INJECTING ELEMENT. SEPT. 14, 1976.

Class 12F

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3 1972. CAN. 0958580, GRB. 1359694.
3,702,289.—PHOTOELECTROPHORETIC PROC-ESS ANE APPARATUS. NOV. 7, 1972. CAN. 0958579, GRB. 1359695.
3,705,766.—PHOTOELECTROPHORETIC APPARATUS. DEC. 12, 1972. CAN. 0955100, GRB. 1359862.

Class 12G

3,655,550.—ELECTROSTATIC PIGMENT FILTER. APR. 11, 1972.
3,656,200.—CLEANING APPARATUS. APR. 18, 1972.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.
3,659,302.—CLEANING APPARATUS. MAY 2, 1972.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,686,035.—CLEANING APPARATUS. AUG. 22, 1972. CAN. 0925660, GRB. 1335989.
3,821,027.—METHOD OF CLEANING ACCUMULATED MATERIAL FROM A SLOT. JUNE 28, 1974.
3,919,737.—CLEANING APPARATUS. NOV. 18, 1975.
3,945,724.—VELOCITY COMPOSITION FOR BEAD BYPASS. MAR. 23, 1976.
3,950,088.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. APR. 13, 1976.
3,986,772.—BEAD BYPASS. OCT. 19, 1976.
3,988,060.—BEAD BYPASS SPEED REDUCTION. OCT. 26, 1976.
3,989,365.—MOTION COMPENSATION FOR BEAD BYPASS. NOV. 2, 1976.
4,066,452.—VELOCITY COMPENSATION FOR BEAD BYPASS. JAN. 3, 1978.

Class 12H

3,505,131.—PROCESS FOR THE PREPARATION OF A CUPROUS IODIDE CONDUCTIVE FILM. APR. 7, 1970. CAN. 0876074, GER. 1800653, GRB. 1244012, JAP. 0615874.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,623,805.—DRIVE MECHANISM FOR IMAGING APPARATUS. NOV. 30, 1971.
3,628,859.—IMAGING MACHINE IMPROVEMENT. DEC. 21, 1971. BEL. 0760455, CAN. 0937436, FRA. 7047139, GRB. 1339549, ITL. 0913635, JAP. 0764505.
3,630,615.—METHOD AND APPARATUS FOR TRANSPORTING SUPPORT MATERIAL. DEC. 28, 1971.
3,630,884.—TRANSPARENT ELECTRODE IMAGING IMPROVEMENT. DEC. 28, 1971. CAN. 0890359, GRB. 1313696, JAP. 0739525.
3,639,049.—COPY SYSTEM. FEB. 1, 1972.
3,640,616.—OPAQUE ILLUMINATION AND SCANNING SYSTEM. FEB. 8, 1972. CAN. 0926674, GRB. 1337418, JAP. 0731615.
3,647,294.—MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS. MAR. 7, 1972. CAN. 0913355, GRB. 1337146, JAP. 0759478.
3,654,654.—CLEANING APPARATUS. APR. 11, 1972. CAN. 0925257, GRB. 1335850, JAP. 0791054.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,685,897.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. AUG. 22, 1972. CAN. 0957542.
3,687,109.—MATERIALS APPLICATION APPARATUS. AUG. 29, 1972. CAN. 0915907, GRB. 1337148.
3,697,167.—OPTICAL PROJECTION APPARATUS. OCT. 10, 1972. BEL. 0772913, CAN. 0955090. FRA. 7134731, GRB. 1316023, ITL. 0936735.
3,703,459.—LIQUID APPLICATOR. NOV. 21, 1972.
3,718,393.—IMAGING APPARATUS. FEB. 27, 1973.
3,722,993.—MATERIALS APPLICATION APPARATUS. MAR. 27, 1973.
3,730,620.—FOCUSING METHOD. MAY 1, 1973.
3,737,221.—ROTATIONAL DRIVE MECHANISM. JUNE 5, 1973.
3,744,897.—TRANSPARENT ELECTRODE FOR ELECTROPHORETIC IMAGING. JULY 10, 1973.
3,769,850.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. NOV. 6, 1973.
3,776,628.—PHOTOELECTROPHORETIC IMAGING SYSTEM. DEC. 4, 1973.
3,784,294.—IMAGE DENSITY CONTROL. JAN. 8, 1974.

3,840,299.—PHOTOELECTROPHORETIC IMAGING APP FOR VARYING ADVANCING RATE OF VELOCITY OF ROLLER ELECTRODES. OCT. 8, 1974.

3,844,651.—PHOTELCTRPHRTC IMG APP FOR CONTRLNG TIME INTRVL OF SUCSSV ROLLR ELCTRDS LEAVNG AND ENTERNG IMG RE. OCT. 29, 1974.

3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.

3,950,640.—LAMP CONTROL AND LAMP SWITCH CIRCUIT FOR CONTROLLING LIGHT BALANCE. APR. 13, 1976.

3,952,700.—LIQUID APPLICATOR. APR. 27, 1976.

3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,957,510.—OVERFLOW PREVENTION FOR LIQUID BETWEEN FLEXIBLE LAYERS ON A SOLID SURFACE. MAY 18, 1976.

3,981,459.—PHOTOELECTROPHORETIC ELECTROSTATIC TACKING CAPSTAN WEB TENSION SYS. SEPT. 21, 1976.

3,982,710.—PHOTOELECTROPHORETIC WEB TENSION SYSTEM. SEPT. 28, 1976.

3,985,434.—PHOTOELECTROPHORETIC PIGMENT DISCHARGING WITH AC COROTRON OR UV ILLUMINATION. OCT. 12, 1976.

3,989,366.—PHOTOELECTROPHORETIC IMAGING APPARATUS HAVING A DEVICE FOR INCREASING THE FRICTION FORCE BETWEE. NOV. 2, 1976. BEL. 0841080.

3,989,367.—APPARATUS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACTED. NOV. 2, 1976.

3,991,992.—PHOTOELECTROPHORETIC WEB MACHINE SERVO DRIVE SYSTEM. NOV. 16, 1976. BEL. 0841079.

4,049,343.—COMBINATION IMAGING AND GROUNDING ROLLER. SEPT. 20, 1977. BEL. 841076, FRA. 7612176.

4,059,443.—ELECTRICAL INFORMATION STORAGE SYSTEM. NOV. 22, 1977.

4,073,583.—PHOTOELECTROPHORETIC HEAT & PRESSURE TRANSFER MECHANISMS. FEB. 14, 1978. BEL. 841078, FRA. 7612171.

4,084,896.—PHOTOELECTROPHORETIC WEB IMAGING APPARATUS. APR. 18, 1978. BEL. 841077, FRA. 7612178.

Class 12I

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.

3,820,987.—PHOTOELECTROPHORETIC IMAGING WITH FIXING ON A SEPARATE ELECTRODE. JUNE 28, 1974.

Class 12J

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.

3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

4,065,304.—METHOD FOR FIXING INK IMAGES. DEC. 27, 1977. BEL. 848487.

Class 12K

3,510,419.—PHOTOELECTROPHORETIC IMAGING METHOD. MAY 5, 1970. ARG. 0165519, AUS. 0425666, BEL. 0717829. CAN. 0876044, FRA. 0095234, GRB. 1242262, ITL. 0896927, JAP. 0657876, MEX. 0102064, PNM. 0001975, PRU. 0010174, VZL. 0023693.

3,561,864.—ELECTROPHORETIC COATING DEVICE. FEB. 9, 1971. ARG. 0174608, ATR. 0302815, AUS. 0447649, BEL. 0739544, CAN. 0890357, FRA. 6933095, GER. 1949861, GRB. 1277806, ITL. 0873705, JAP. 0686763, MEX. 0113013.

3,609,029.—MATERIALS APPLICATION APPARATUS. SEPT. 28, 1971. BEL. 0772565, CAN. 0953097, FRA. 7133987, GRB. 1366382, ITL. 0936510.

3,619,053.—PHOTOELECTROPHORETIC IMAGING SYSTEM. NOV. 9, 1971. GRB. 1324102, JAP. 0759477.

3,620,948.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING PRELIMINARY ELECTROPHRIC DSPSTN OF IMAGNG SUSPENS. NOV. 16, 1971. ATR. 0326480, AUS. 0447819, BEL. 0739754, CAN. 0899137, FRA. 6933734, GRB. 1280027, HOL. 0146951, ITL. 0877872, JAP. 0709041, MEX. 0114889, SPN. 0372065, STZ. 0508232, SWD. 0341929, VZL. 0015070.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.

3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.

3,744,896.—IMAGING SYSTEM. JULY 10, 1973.

3,769,009.—INKING SYSTEM FOR LIQUID PARTICLE MIGRATION ON AUTOMATIC MACHINE. OCT. 30, 1973. HOL. 7216013.

3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.

3,968,271.—COATING APPARATUS AND USE THEREOF. JULY 6, 1976.

3,993,020.—BLADE APPLICATOR ASSEMBLY. NOV. 23, 1976.

4,019,816.—COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE. APR. 26, 1977.

Class 12L

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.

3,649,515.—PHOTOGRAPHIC MASKING SYSTEM. MAR. 14, 1972. CAN. 0936733, GRB. 1349610, JAP. 0774711.

3,715,209.—ELECTRICAL COLOR MASKING FOR A PHOTOELECTROPHORETIC IMAGING PROCESS. FEB. 6, 1973. BEL. 0763539, CAN. 0938491, FRA. 7107557. GRB. 1347139, ITL. 0918979, JAP. 0752723, MEX. 0120935.

3,810,758.—PHOTOGRAPHIC MASKING SYSTEM. MAY 14, 1974.

Class 12M

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.

3,402,177.—SUBSTITUTED 1-CYANO-2, 3-PHTHALOYL-7, 8-BENZOPYRROCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODLOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPHTO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,474,020.—PHOTOELECTROPHORETIC IMAGING PROCESS USING QUINACRIDONES. OCT. 21, 1969. ARG. 0154377, AUS. 0414491, BEL. 0683405, CAN.

0834673, FRA. 0090574, GRB. 1155403, ITL. 0842587, JAP. 0601872, MEX. 0088935, SPN. 0328503, SWD. 6608734, VZL. 0023989.

3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 0155985, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.

3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUORESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965, JAP. 0586923.

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.

3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.

3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.

3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

3,560,360.—PHOTOELECTROPHORETIC IMAGING PROCESS AND ANTHRAQUINONES AS THE ELECTRICALLY PHOTOSENSITIVE PARTIC. FEB. 2, 1971. CAN. 0850590, MEX. 0096584.

3,562,248.—BISAZO PGMTS DRVD CPLRS OBTD CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889°36, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484. GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,615,558.—PHOTOLECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY-DIVIDED PHTHALOCYANINE PIGMENT. OCT. 26, 1971. CAN. 0850022.

3,616,393.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA RNS. OCT. 26, 1971.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,635,981.—PHOTOELECTROPHORETIC IMAGING PIGMENT COMPOSITION AND PROCESS. JAN. 18, 1972. ARG. 0193337, ATR. 0305459, AUS. 0448778, BEL. 0741064, CAN. 0953143, FRA. 6937772, GER. 1955001, GRB. 1285610, ITL. 0879711, JAP. 0685461, MEX. 0114879.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,652,438.—PHTELCTRPHRTC IMGNG PROCS USNG DIVLNT HVY MTL SLT OR 1-1-SULFO-2-NAPHYLZO-2-NAPHLS AS IMGNG MAT. MAR. 28, 1972.

3,658,675.—PHOTOELECTROPHORETIC IMAGING PROCESS USING BISAZO PIGMENTS. APR. 25, 1972.

3,692,517.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING AN INSULATING CARRIER LQD CNTNG UNSATURATED COMP. SEPT. 19, 1972. ARG. 0164485, AUS. 0430397, BEL. 0715670, CAN. 0913968, FRA. 1563583, GER. 1772522, GRB. 1225316, ITL. 0834948, JAP. 0641521, MEX. 0100255, VZL. 0032921.

3,705,901.—PHOTOELECTROPHORETIC IMAGING COMPOSTION. DEC. 12, 1972.

3,753,708.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING QUINACRIDONE PIGMENTS. AUG. 21, 1973.

3,758,305.—PHOTOELECTROPHORETIC IMAGING PROCESS. SEPT. 11, 1973.

3,825,422.—IMAGING PROCESS. JULY 23, 1974. CAN. 0984201, GRB. 1442667.

3,867,141.—PHOTOELCTRC AND ELCTRPHOTGRPHC PGMNTS COMPRISNG DERIVATIVS OF CNDNSD PLYCLC AROMTC HYDROCRBN ALDE. FEB. 18, 1975.

3,922,169.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. NOV. 25, 1975.

3,923,506.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. DEC. 2, 1975.

3,953,462.—IMAGING PROCESS. APR. 27, 1976. ARG. 0202139, BEL. 0821400, GRB. 1467999.

3,957,829.—CERTAIN DINAPHTHO (1,2-B;2',3'-D)-FURAN-7,12 DIONES. MAY 18, 1976.

4,012,252.—IMAGING PROCESS UTILIZING 3-BROMO-N-2''-PYRIDYL-8,13-DIOXODIMAPHTHO-(2,1-; 3',3'-)-FURON-6-CARBO. MAR. 15, 1977. ARG. 0202139, BEL. 0821400, GRB. 1467999.

4,017,311.—PHOTOELECTROPHORETIC IMAGING SUSPENSION. APR. 12, 1977.

4,032,339.—PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORECTIC IMAGING. JUNE 28, 1977.

4,062,854.—PROCESS FOR PREPARING N-SUBSTITUTED-8,13-DIOXODINAPHTHO-(2,1-B; 2,3-D)FURAN-6-CARBOXAMIDE. DEC. 13, 1977. CAN. 1023360, FRA. 7423881.

4,076,527.—PHOTOSENSITIVE COMPOSITION USEFUL IN PHOTOELECTROPHORETIC IMAGING. FEB. 28, 1978.

Class 12N

3,446,722.—ELECTROPHORETIC REFINING OF PHOTOSENSITIVE PARTICLES. MAY 27, 1969. AUS. 0424699, BEL. 0743903, CAN. 0840368. GER. 1622376, GRB. 1189636.

3,473,940.—PREPARATION OF PHOTOELECTROPHORETIC IMAGING SUSPENSION. OCT. 21, 1969. BEL. 0743899, CAN. 0847808, FRA. 1524448, GER. 1572386, GRB. 1161780, ITL. 0794432, JAP. 0594583, MEX. 0097623.

3,477,934.—IMAGING PROCESS. NOV. 11, 1969. ARG. 0158372, AUS. 0416251, BEL. 0700645, CAN. 0850023, FRA. 1550998, GRB. 1196044, ITL. 0804665, JAP. 0725097, MEX. 0098737, SPN. 0342376, STZ. 0481408, SWD. 0336525, VZL. 0021263.

3,551,313.—IMAGE CONTRAST CONTROL IN PHOTOELECTROPHORETIC IMAGING - PHAROS CONTRAST CONTROL. DEC. 29, 1970. ATR. 0302814, AUS. 0448317, BEL. 0738218, CAN. 0899689, FRA. 6929449, GER. 1944510, GRB. 1274525, ITL. 0871538, JAP. 0708365, SWD. 0341130.

3,553,093.—COLOR PHOTOELECTROPHORETIC IMAGING PROCESS. JAN. 5, 1971. ATR. 0286783, AUS. 0416331, BEL. 0692911, CAN. 0818388, FRA. 1471745, GER. 1522743, GRB. 1149665, IND. 0104183, ISR. 0025304. ITL. 0762674, JAP. 0608337, MEX. 0089790, NOR. 0123368, NZL. 0144531, STZ. 0479099, SWD. 0334540.

3,586,615.—PHOTOELECTROPHORETIC IMAGING PROCESS INCLUDING THE USE OF AN ELECTRICALLY CHRGD SUSPNSN COATNG. JUNE 22, 1971. BEL. 0743921, CAN. 0891972, FRA. 6945567, GER. 1965460, GRB. 1284429, HOL. 1284429, ITL. 0880418, JAP. 0729281.

3,595,770.—SEQUENTIAL PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176384, ATR. 0299697, AUS. 0429715, BEL. 0722300, BRA. 0087996, CAN. 0891970, CHL. 0024332, DNK. 0126879, FRA. 1589548, GRB. 1239259, ITL. 0845021, LXB. 0057101, MEX. 0103850, NZL. 0154114, PNM. 0001418, PTG. 0050485, SAF. 0686705, SPN. 0359239, STZ. 0496265, SWD. 0339172, URG. 0009317, VZL. 0023705.

3,601,483.—IMAGING APPARATUS. AUG. 24, 1971.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,616,390.—ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRCLY PHOTSNSTV PRTCLS AT LIQUI. OCT. 26, 1971. ATR. 0322980, AUS. 0448380. BEL. 0743423, CAN. 0890356, FRA. 6944288, GER. 1947105, GRB. 1249546, ITL. 0879048, JAP. 0688351.

3,616,395.—PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION. OCT. 26, 1971. CAN. 0922142, GRB. 1318565, JAP. 0756962.

3,620,950.—ELECTROPHORETIC IMAGING EMPLOYING PERIODIC ELECTROMAGNETIC RADIATION. NOV. 16, 1971. ATR. 0302045, AUS. 0449606, BEL. 0739750, CAN. 0887022, FRA. 5934262, GRB. 1283384, ITL. 0877875, JAP. 0718339.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,642,598.—PHOTOELECTROPHORETIC IMAGING METHOD AND APPARATUS. FEB. 15, 1972. ARG. 0188632, BEL. 0756481, CAN. 0922144, FRA. 7034709, GRB. 1324105, ITL. 0908073, JAP. 0740359, MEX. 0115601, VZL. 0032786.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,647,659.—PHTELCTRPHRTC IMGNG PRCS WHEREIN IMGNG ELCTRCL FLD APPLD SUBSEQUENT TO IMAGE WISE EXPOSURE. MAR. 7, 1972. BEL. 0772912, CAN. 0958581, FRA. 7134730, GRB. 1354798, ITL. 0936734.

3,657,091.—ELECTROPHORETIC IMAGING METHOD EMPLOYING A PERIODIC ELECTRIC FIELD. APR. 18, 1972. ARG. 0174612, ATR. 0302816, AUS. 0448524, BEL. 0739752, CAN. 0913970, FRA. 6933735, GRB. 1282469, ITL. 0889439, JAP. 0709039, MEX. 0114739.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,664,941.—PHTELCTRPHRTC REVERSAL IMGNG USNG SUSPENSION CONTAINING VITAMIN PRECURSOR, B-CAROTENE. MAY 23, 1972.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,676,313.—REMOVING UNDESIRED POTENTIAL FROM BLOCKING ELECTRODE IN A PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 11, 1972.

3,681,221.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. AUG. 1, 1972. CAN. 0935013, GRB. 1348121.

3,696,020.—ELECTROPHORETIC IMGNG APRTS INCLUDING MEANS TO COAT AND ELCTRFY IMGNG ELCTRODE. OCT. 3, 1972.

3,723,288.—ELECTROPHORETIC IMAGING APPARATUS INCLUDING MEANS TO PROJECT AN IMAGE AT A LIQUID NIP. MAR. 27, 1973.

3,737,310.—BACKGROUND REDUCTION. JUNE 5, 1973.

3,741,639.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. JUNE 26, 1973.

3,741,760.—IMAGING SYSTEM. JUNE 26, 1973.

3,748,035.—METHOD FOR SEQUENTIAL ILLUMINATION IN A POLYCHROME PROCESS. JULY 24, 1973. CAN. 0960288, GRB. 1416328.

3,772,013.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING ELECTRICALLY PHOTOSENSITIVE PARTICLES AND INERT PA. NOV. 13, 1973. ARG. 0196295, ATR. 0327682, BEL. 0777724, CAN. 0957543, FRA. 7200998, GRB. 1370026, ITL. 0946356, JAP. 0759477, MEX. 0124561, SPN. 0398586, SWD. 0367075, VZL. 30687.

3,782,932.—ELECTROPHORETIC IMAGING PROCESS USING TRANSPARENT PARTICLES. JAN. 1, 1974. ATR. 0302043, AUS. 0446066, BEL. 0743424, CAN. 0913441, FRA. 6944289, GER. 1949149, GRB. 1280900, ITL. 0897053. JAP. 0699518.

3,785,816.—ELIMINATING CORONA ARCING IN PHOTOELECTROPHORETIC IMAGING. JAN. 15, 1974.

3,787,206.—PHOTOELECTROPHORETIC IMAGING METHOD INCLUDING AT LEAST ONE ELECTRODE CARRYING A PATTERN. JAN. 22, 1974.

3,801,195.—ELECTROPHORETIC IMAGING. APR. 2, 1974. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,804,620.—METHOD OF PRODUCING PLANOGRAPHIC PLATES BY PHOTOELECTROPHORETIC IMAGING. APR. 16, 1974.

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

3,850,627.—ELECTROPHORETIC IMAGING METHOD. NOV. 26, 1974. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,857,549.—PHOTOELECTROPHORETIC IMAGING APPARATUS. DEC. 31, 1974.

3,857,707.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DRY PIGMENT COATED SUBSTRATE. DEC. 31, 1974.

3,881,920.—PHOTOELECTROPHORETIC IMAGING PROCESS. MAY 6, 1975.

3,901,701.—PHOTOELECTROPHORETIC IMAGING PROCESS USING PHOTOCONDUCTIVE ELECTRODE WHICH ALTERS SPECTRAL RESPONSE. AUG. 26, 1975.

3,905,812.—IMAGING PROCESS. SEPT. 16, 1975. FRA. 7413994, GRB. 1443121.

3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,933,487.—IMAGING COMPOSITION FOR PHOTOELECTROPHORETIC IMAGING SYSTEM. JAN. 20, 1976. CAN. 0973005, GRB. 1375941.

3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,961,949.—PHOTOELECTROPHORETIC IMAGING METHOD PRODUCING A DESIRED IMAGE BORDER. JUNE 8, 1976.

3,967,960.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING DARK CHARGE INJECTING ELEMENT. JULY 6, 1976.

4,023,968.—PHOTOELECTROPHORETIC COLOOR IMAGING PROCESS IN WHICH BACK MIGRATION IS ELIMINATED. MAY 17, 1977.

4,069,047.—TRANSFER OF PHOTOELECTROPHORETIC IMAGES. JAN. 17, 1978.

4,078,928.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 14, 1978.

Class 12O

3,647,660.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION. MAR. 7, 1972.

3,869,286.—PHOTOELECTROPHORETIC IMAGING WITH COPPER-FREE CHLOROPHYLL IN THE CARRIER LIQUID. MAR. 4, 1975.

Class 12P

RE.28,260.—ELECTROPHORETIC IMAGING PROCESS INCLUDING APPL OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION. DEC. 3, 1974. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.

3,595,772.—METHOD OF BREAKING PARTICLE AGGLOMERATES IN THE PHOTO-ELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176808, ATR. 0293875, AUS. 0445175, BEL. 0739749, CAN. 0912398, FRA. 6934261, GRB. 1290370, ITL. 0887503, JAP. 0712831, MEX. 0127747.

3,616,391.—ELECTROPHRTC IMGNG PRCSS INC APPLCTN OF DYNAMIC STRESS ON PARTCL SUSPSN-REISSUED D 2177R. OCT. 26, 1971. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,743,404.—PHTOELECTROPHORETIC IMGNG APPTS INCNG MEANS TO SIMULTNUSLY APPLY COMPRSVE STRESS AND SHEAR TO IMGNG. JULY 3, 1973.

3,784,302.—ELECTROPHORETIC IMAGE APPARATUS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENS. JAN. 8, 1974.

3,833,493.—IMAGING PROCESS. SEPT. 3, 1974.

3,943,049.—APPARATUS FOR SEPARATING AGGLOMERATED PARTICLES WITH SUSPENSION. MAR. 9, 1976.

Class 12Q

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN.

0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.

3,655,370.—PHOTOELECTROPHORETIC IMAGE TRANSFER. APR. 11, 1972.

3,705,797.—FIXING PROCESS FOR PHOTOELECTROPHORETIC IMAGING. DEC. 12, 1972.

3,711,196.—IMAGE TRANSFER. JAN. 16, 1973.

3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.

3,804,508.—PHOTOELECTROPHORETIC APPARATUS FOR HEAT FACING AN IMAGE. APR. 16, 1974.

3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

4,065,304—METHOD FOR FIXING INK IMAGES. DEC. 27, 1977. BEL. 848487.

Class 12R

3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0899118, JAP. 0710908.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,682,628.—PHOTOELECTROPHORETIC FACSIMILE TRANSMISSION. AUG. 8, 1972. CAN. 0957889, GRB. 1365163.

3,800,302.—RECORDING OSCILLOGRAPH UTILIZING PHOTOELECTROPHORETIC TECHNIQUES. MAR. 26, 1974.

3,849,132.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A CHROMOGENIC REACTION. NOV. 19, 1974. BEL. 0809399, GRB. 1447104.

3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

Class 15

3,693,517.—PRINTING APPARATUS—KALEIDOSCOPE PRINTER WITH CIRCUMFERENTIAL STRIPS. SEPT. 26, 1972. CAN. 0948265, GRB. 1330327.

3,801,319.—IMAGING METHOD UTILIZING CHEMICAL REACTIVITIES OF PHOTOEXCITED STATES OF AROMATIC HYDROXY COMPO. APR. 2, 1974. CAN. 1000549, GRB. 1429501.

3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

3,851,584.—CHEMICAL REPRODUCTION SYSTEMS. DEC. 3, 1974.

3,888,670.—IMAGING METHOD. JUNE 10, 1975.

3,915,706.—IMAGING SYSTEM BASED ON PHOTODEGRADABLE POLYALDEHYDES. OCT. 28, 1975.

3,923,514.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. DEC. 2, 1975.

3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.

3,930,858.—HEAT DEVELOPMENT PROCESS UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A HALOGENATED POLYME. JAN. 6, 1976.

3,963,491.—IMAGING METHOD. JUNE 15, 1976.

3,986,874.—DRIOGRAPHIC IMAGING METHOD. OCT. 19, 1976.

3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.

4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.

4,032,980.—RECORDED MAGNETIC MEMBER VIEWING APPARATUS. JUNE 28, 1977.

4,043,298.—MAGNETIC TONER SCAVENGING SYSTEM. AUG. 23, 1977.

4,064,453.—MAGNETIC FIELD DETECTOR. DEC. 20, 1977.

4,074,276.—MAGNETIC IMAGING SYSTEM USING HEAT. FEB. 14, 1978.

4,076,387.—MAGNETIC DISPLAY. FEB. 28, 1978.

4,089,684.—IMAGING METHOD UTILIZING THE CHEMICAL REACTIVITY OF DONOR-ACCEPTOR MIXTURES. MAY 16, 1978.

4,095,233.—METHOD FOR FORMING A CHARGE PATTERN. JUNE 13, 1978.

4,100,088.—IMAGING COMPOSITION. JULY 11, 1978.

4,101,943.—CONTROLLED-WIDTH-SYNCHRONIZATION OF RECORDED PIXELS. JULY 18, 1978.

Class 15A

3,320,060.—DEFORMATION IMAGE REPRODUCTION PROCESS UTILIZING A VOLTAGE THRESHOLD REDUCING SURFACTANT. MAY 16, 1967. CAN. 0807325, FRA. 1416119, GER. 1261867, GRB. 1097919, ITL. 0739830, JAP. 0519668.

3,338,710.—FROST THERMOGRAPHY. AUG. 29, 1967.

3,404,001.—THERMOPLASTIC DEFORMATION IMAGING WITH COLOR REAGENTS. OCT. 1, 1968. CAN. 0801265, FRA. 1459100, GER. 1497214, GRB. 1124925, ITL. 0725974, JAP. 0529727.

3,615,387.—STRIPPABLE LAYER RELIEF IMAGING PROCESS. OCT. 26, 1971. CAN. 0887033.

3,697,184.—APPARATUS FOR EVALUTING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1083484, GRB. 1389471.

3,715,207.—ELCTRSTCLY DEFORMABLE THERMOPLASTIC LAYER CONTAINING A 1,4-DIALKYLAMINO-9, 10-ANTHRAQUINONE DYE. FEB. 6, 1973.

3,729,310.—SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER. APR. 24, 1973.

3,741,759.—FROST IMAGING PROCESS. JUNE 26, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,869,612.—COPY APPARATUS WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING. MAR. 4, 1975. STZ. 0032775.

3,893,416.—DEVELOPMENT AND CLEANING APP FOR REVERSE PATH MACHINE. JULY 8, 1975.

3,902,062.—REVERSE PATH IMAGING AND TRANSFIXING COPYING METHOD. AUG. 26, 1975. BEL. 0823656.

3,904,875.—SINGLE RADIATION RAY PATH FOR THERMOGRAPHIC IMAGING & TRANSFIXING OR FUSING. SEPT. 9, 1975. ARG. 0207128.

3,906,896.—INK APPLICATOR. SEPT. 23, 1975. CAN. 0974753.

3,908,125.—REVERSE PATH IMAGING AND TRANSFIXING COPYING MACHINE. SEPT. 23, 1975.

3,909,613.—COPYING METHOD AND APP WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING OR FUS. SEPT. 30, 1975.

3,923,004.—DEVELOPMENT AND CLEANING APPARATUS FOR REVERSE PATH MACHINE. DEC. 2, 1975. BEL. 0823656.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,230.—COPY METHOD UTILIZING SINGLE RADIANT RAY PATH FOR IMAGING AND TRANSFIXING. MAR. 23, 1976.

3,949,160.—ELECTRO-OPTIC READ OUT OF THERMOPLASTIC DEFORMATION PATTERNS. APR. 6, 1976.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,984,262.—METHOD OF MAKING A SUBSTRATE STRIPED PLANAR LASER. OCT. 5, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,051,463.—METHOD AND APPARATUS FOR INVERTING THE POLARITY OF AN INPUT IMAGE FORMED ON A SURFACE OF AN. SEPT. 27, 1977. FRA. 7701769.

4,063,222.—SELECTIVE ERASURE OF IMAGE RECORDING DEVICES. DEC. 13, 1977. FRA. 7701592.

4,099,262.—AUTOMATIC MEMORY CONTROL FEEDBACK SYSTEM FOR A CYCLING OPTICAL IMAGING SYSTEM. JULY 4, 1978.

Class 15B

3,350,205.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. OCT. 31, 1967. CAN. 0717934, GRB. 1095174, JAP. 0561238.

3,561,962.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. FEB. 9, 1971.

3,834,906.—LIGHT ACTIVATING IMAGING PROCESS. SEPT. 10, 1974.

3,885,963.—LIGHT ACTIVATING IMAGING PROCESS. MAY 27, 1975.

3,890,147.—LIGHT ACTIVATING IMAGING PROCESS. JUNE 17, 1975.

3,892,180.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

3,892,570.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

Class 15B 2

3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.

Class 15C

3,250,636.—MTD AND APTS IMAGE REPRODCTN W/USE OF REUSABLE HEAT DEMAGNETIZABLE FERROMAGNETIC IMAGING LAYER. MAY 10, 1966. CAN. 0711404, GRB. 1070986, JAP. 0487336.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GER. 1671576, GRB. 1208307.
4,014,065.—MAGNETIC DEVELOPER REMOVAL SYSTEM. MAR. 29, 1977.
4,030,104.—THERMO-MAGNETIC IMAGE TRANSFER APPARATUS. JUNE 14, 1977.
4,032,923.—THERMOMAGNETIC IMAGING APPARATUS. JUNE 28, 1977.
4,035,810.—MAGNETIC INTERPOSITIVE METHOD WITH ELECTROSTATIC IMAGING. JULY 12, 1977.
4,038,665.—DONOR TRANSFER OF MAGNETIC TONER. JULY 26, 1977.
4,060,811.—MAGNETIC LATENT IMAGE CREATION. NOV. 29, 1977.
4,067,018.—EXCESSIVE MAGNETIC DEVELOPER DISPLACEMENT SYSTEM. JAN. 3, 1978.
4,092,954.—HIGH SPEED TANK DEVELOPMENT SYSTEM. JUNE 6, 1978.
4,096,485.—SUCCESSIVE DEVELOPMENT MAGNETIC IMAGING APPARATUS. JUNE 20, 1978.
4,101,320.—MAGNETIC IMAGING METHOD. JULY 18, 1978.
4,101,904.—MAGNETOGRAPHIC IMAGING MEMBER AND THE METHOD OF ITS USE. JULY 18, 1978.
4,101,943.—CONTROLLED-WIDTH-SYNCHRONIZATION OF RECORDED PIXELS. JULY 18, 1978.

Class 15D

3,441,410.—DEFORMATION IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. APR. 29, 1969. CAN. 0801267, FRA. 1485348, GER. 1522696, GRB. 1156151, JAP. 0545759.
3,441,411.—IMAGE FORMATION THROUGH CHEMICAL REACTION OF PHOTOCHROMIC MATER. APR. 29, 1969. CAN. 0834676, GRB. 1165215.
3,442,646.—FRMATION OF LIGHT SCATTERING IMGS IN LAYERS COMPRSNG ORGANIC PHOTOCHROMIC MATERIALS. MAY 6, 1969. GRB. 1164484.
3,450,530.—PHOTOGRAPHIC IMAGING BY MEANS THE SURFACE TENSION CREATED BY PHOTOCHROMIC MATERIALS. JUNE 17, 1969.
3,450,531.—ADHESIVE IMAGING ON PHOTOCHROMIC LAYERS. JUNE 17, 1969.
3,450,533.—FORMATION OF LIGHT SCATTERING IMAGES IN PHOTOCHROMIC LAYERS. JUNE 17, 1969. CAN. 0875500.
3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.
3,967,964.—PHOTOSENSITIVE FILM COPRINSING AN ORGANOSELENIUM AND AN ORGANSMERCURY. JULY 6, 1976.
3,973,966.—PHOTOCHROMIC COMPOSITION CONTAINING A DIPHENYL DIBENZOCHRON-3-ENE. AUG. 10, 1976.
4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.
4,050,937.—IMAGEWISE EXPOSING AND HEATING A MICROIMAGING FILM CONTAINING AN ORGANO DISELENIDE, A TERTI. SEPT. 27, 1977.
4,050,939.—MICROIMAGING FILM CONTAINING AN ORGANO DISELENDIE, A TERTIARY PHOSPHINE OR PHOSPHITE AND AN. SEPT. 27, 1977.

Class 15E

3,635,708.—VESICULAR IMAGING PROCESS. JAN. 18, 1972.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

Class 15F

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,753,705.—AGGLOMERATION IMAGING PROCESS USING HARDENABLE MATERIAL. AUG. 21, 1973. CAN. 0929350, GRB. 1330518.
4,029,502.—IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL. JUNE 14, 1977. ARG. 0172317, BEL. 0737813, CAN. 0884217, FRA. 6928725, GER. 1942380, GRB. 1286501, ITL. 0870234, SWD. 0340954.
4,082,549.—AGGLOMERATION IMAGING PROCESS. APR. 4, 1978.
4,084,966.—IMAGING SYSTEM USING AGGLOMERABLE MIGRATION MARKING MATERIAL. APR. 18, 1978.

Class 17A

3,909,609.—LIGHT SOURCE MEASURING APPARATUS. SEPT. 30, 1975.

Class 17A 1

2,774,887.—RADIATION SENSING DEVICE. DEC. 18, 1956.
3,445,660.—METHOD FOR DETECTION OF ULTRAVIOLET RADIATION. MAY 20, 1969.

Class 17A 2

3,330,700.—SOLAR-CELL PANELS. JULY 11, 1967.
3,359,137.—SOLAR CELL CONFIGURATION. DEC. 19, 1967.
3,513,040.—RADIATION RESISTANT SOLAR CELL. MAY 19, 1970.

Class 17A 3

3,351,493.—DIFFUSED RADIATION TRACKING TRANSDUCER HAVING A LATERAL PHOTO VOLTAGE JUNCTION. NOV. 7, 1967.
3,443,102.—SEMICONDUCTOR PHOTOCELL DETECTOR WITH VARIABLE SPECTRAL RESPONSE. MAY 6, 1969.

Class 17A 4

3,013,158.—LINEARIZATION OF LATERAL PHOTOCELLS. DEC. 12, 1961.
3,901,607.—HIGH APERTURE REFLECTION PHOTODETECTOR APPARATUS. AUG. 26, 1975.
4,085,321.—MULTIPHASE PHOTOACTIVATED SWITCH. APR. 18, 1978.

Class 17B

2,021,884.—PHOTOGRAPHING APPARATUS. NOV. 26, 1935.
3,650,604.—INTER-FERAMETRIC SCANNING APPARATUS AND METHOD. MAR. 21, 1972. CAN. 0954354, GRB. 1363263.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,902,061.—DIGITAL OPTICAL COMPUTER TECHNIQUES. AUG. 26, 1975.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,987,685.—CURSOR POSITION DEVICE. OCT. 26, 1976.

Class 17B 1

3,476,473.—FONT INDICATOR. NOV. 4, 1969.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,501,838.—PANTOGRAPHIC IMPLEMENTED OVERHEAD PROJECTOR. MAR. 24, 1970.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,677,148.—OPTICAL RECORDER. JULY 18, 1972.
3,678,820.—OPTICAL SYSTEM FOR PROJECTION RECORDING APPARATUS. JULY 25, 1972.
3,685,406.—OPTICAL RECORDER. AUG. 22, 1972. BEL. 0777014, CAN. 0960743, FRA. 7146254, GRB. 1372379, ITL. 0944111.
3,695,161.—ALPHANUMERIC PROJECTION DISC ASSEMBLY. OCT. 3, 1972.

3,700,325.—OPTICAL SYSTEM FOR PHOTOCOPYING APPARATUS. OCT. 24, 1972. BEL. 0764830, CAN. 0931409, FRA. 7111622, GRB. 1337447, ITL. 0922162.
3,705,543.—OPTICAL RECORDER. DEC. 12, 1972. CAN. 0948266, GRB. 1372378.
3,759,149.—MULTIPLE FLASH LAMP ALPHANUMERIC PROJECTION DISC ASSEMBLY. SEPT. 18, 1973. CAN. 1002363.
3,759,612.—OPTICAL SYSTEM. SEPT. 18, 1973. BEL. 0792669, CAN. 0972193, FRA. 7243897, GRB. 1395580, ITL. 0984616, SWD. 7216146.
3,768,384.—PROJECTION ASSEMBLY. OCT. 30, 1973.
3,873,207.—POLARIZING INTERFEROMETER. MAR. 25, 1975.
3,880,497.—METHOD OF STORING OPTICAL INFORMATION ON A RANDOM CARRIER. APR. 29, 1975. CAN. 1004887, FRA. 7408054.
3,883,244.—APERTURE ADJUSTMENT IN OPTICAL ASSEMBLY. MAY 13, 1975.
3,897,136.—POLARIZATION-GRATING MOIRE. JULY 29, 1975.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
4,035,068.—SPECKLE MINIMIZATION IN PROJECTION DISPLAYS BY REDUCING SPATIAL COHERENCE OF IMAGE LIGHT. JULY 12, 1977.
4,082,450.—COMPACT ILLUMINATION SYSTEM FOR OPTICALLY PROVIDING A STRUCTURED PHOTORECEPTOR CHARGE DIST. APR. 4, 1978.
4,082,451.—COMPACT ILLUMINATION SYSTEM FOR OPTICALLY PROVIDING A STRUCTURED PHOTORECEPTOR CHARGE DISTR. APR. 4, 1978.

Class 17B 2

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427. ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,508,812.—HIGHLY CORRECTED SIX ELEMENT GAUSS TYPE LENS. APR. 28, 1970.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660, JAP. 0857539.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,612,662.—EYEPIECE HAVING A WIDE FIELD OF VIEW AND A LARGE EYE RELIEF. OCT. 12, 1971.
3,620,603.—OFF-CENTER FOCUSING SYSTEM. NOV. 16, 1971.
3,630,599.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. DEC. 28, 1971. CAN. 0960891, GRB. 1363113.
3,640,605.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. FEB. 8, 1972.
3,659,922.—SYMMETRICAL HALF-LENS OPTICAL SYSTEM. MAY 2, 1972.
3,672,748.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JUNE 27, 1972. ATR. 0322874, AUS. 0467299, BEL. 0783478, CAN. 0960495, GRB. 1358349, ITL. 0955474, SPN. 0402705, STZ. 0544315, SWD. 7206274.
3,741,621.—ADD LENS PROJECTION SYSTEM WITH BALANCED PERFORMANCE. JUNE 26, 1973. BEL. 0781514, CAN. 0963300, FRA. 7208375, GRB. 1393151, ITL. 0950848.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974. CAN. 1008710.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.
3,865,471.—LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE. FEB. 11, 1975.
3,880,498.—ZOOM LENS ASSEMBLY. APR. 29, 1975.
3,907,401.—HIGH PERFORMANCE OPTICAL OBJECTIVE. SEPT. 23, 1975.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 17B 3

3,393,956.—UNIFORM-FIELD KERR CELL. JULY 23, 1968.
3,408,133.—KERR-CELL CAMERA SHUTTER. OCT. 29, 1968.

Class 17B 4

3,358,081.—FACSIMILE PRINTER WITH FERROELECTRIC MODULATOR. DEC. 12, 1967. CAN. 0898336, GRB. 1128973.
3,360,323.—TRANSVERSE MAGNETO-OPTICAL ROTATOR WITH COMPENSATION OF PHASE BETA RDATION. DEC. 26, 1967.
3,601,468.—OPTICAL LIGHT WAVE MODULATOR FOR REPRESENTING A FIRST COLOR LIGHT WAVE AS SECOND COLOR LIGHT WA. AUG. 24, 1971.
3,938,881.—ACOUSTO-OPTIC MODULATION DEVICE. FEB. 17, 1976.
4,011,009.—REFLECTION DIFFRACTION GRATING HAVING A CONTROLLABLE BLAZE ANGLE. MAR. 8, 1977.
4,050,027.—OPTICAL SIGNAL AMPLIFIER. SEPT. 20, 1977.
4,077,700.—WAVEGUIDE ADDRESSING AND MODULATING METHOD AND APPARATUS. MAR. 7, 1978.

Class 17C

3,870,921.—IMAGE INTENSIFIER TUBE WITH IMPROVED PHOTOEMITTER SURFACE. MAR. 11, 1975.
4,074,143.—OPTOELECTRONIC DEVICE WITH OPTICAL FEEDBACK. FEB. 14, 1978. FRA. 7631992.

Class 17C 1

3,277,297.—ION IMAGE TO ELECTRON IMAGE CONVERTER. OCT. 4, 1966.
3,322,999.—IMAGE-INTENSIFIER TUBE. MAY 30, 1967.
3,519,870.—SPIRLD STRIP MATRL HAVNG PRLEL GROVS FRMNG PLURALITY OF ELCTRN MULTIPLIER CHANNELS. JULY 7, 1970.
3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

Class 17C 2

3,368,077.—INFRA-RED IMAGE INTENSIFIER HAVING A TUNNEL-EMISSION CATHODE HAVING A CONDUCTIVE MOSAIC. FEB. 6, 1968.
3,949,225.—INFRARED IMAGING APPARATUS. APR. 6, 1976.

Class 17C 3

3,446,561.—PASSIVE BRIGHT PATTERN RETICLE. MAY 27, 1969.
3,837,732.—PARTIALLY TRANSPARENT PLATED FOR INCREASED IMAGE CONTRAST. SEPT. 24, 1974. CAN. 0893234, GRB. 1237697, JAP. 0645592.

Class 17C 4

3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.

Class 17D

D.235,655.—DISPLAY DEVICE. JULY 1, 1975.
3,987,413—DETECTION SYSTEM. OCT. 19, 1976.
4,035,061.—HONEYCOMB DISPLAY DEVICES. JULY 12, 1977.

Class 17D 1

3,422,737.—VARIABLE FONT CHARACTER GENERATOR. JAN. 21, 1969. ARG. 0157019, BRA. 0087922, CAN. 0788611, CHL. 0022222, FRA. 1506176, GRB. 1162840, ITL. 0788951, JAP. 0590133, MEX. 0094427.
3,519,867.—ELECTRIC DISCHARGE TUBE FOR DISPLAYING ALPHNUMERIC CHARACTER SYMBOLS. JULY 7, 1970.
3,564,319.—CATHOD RAY TUBE W/MATRIX FRMG ELEMNTL ELECTRN BEAMS AND MEANS

SELECTVLY FRMG INTO CHAR AT FACE PLA. FEB. 16, 1971.

3,587,083.—CHARACTER GENERATION AND DISPLAY SYSTEM. JUNE 22, 1971. CAN. 0858092, FRA. 1582728, GER. 1774884, GRB. 1234580, ITL. 0846528, JAP. 0678504.

3,641,557.—CIRCUIT ARRANGEMENT FOR AN ELECTRIC DISCHARGE TUBE. FEB. 8, 1972.

3,742,484.—CHARACTER GENERATING APPARATUS EMPLOYING BIT STEAM LENGTH CORRECTION. JUNE 26, 1973.

3,781,848.—DISPLAY SYSTEM - CHARACTER GENERATOR SYSTEM A. DEC. 25, 1973.

3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.

3,830,646.—IMAGE REGISTRATION CORRECTION FOR NON-IMPACT PRINTERS. AUG. 20, 1974. CAN. 0986764, FRA. 7339099, GRB. 1440507.

3,911,419.—CONTROLLER FOR CURSOR POSITIONING ON A DISPLAY MEDIUM. OCT. 7, 1975.

3,952,296.—VIDEO SIGNAL GENERATING APPARATUS WITH SEPARATES PROCESSING OF ODD AND EVEN VIDEO BITS. APR. 20, 1976.

4,103,331.—DATA PROCESSING DISPLAY SYSTEM. JULY 25, 1978.

Class 17D 2

RE.28,360.—ELECTROPHORETIC COLOR DISPLAY DEVICE. MAR. 4, 1975.

3,524,022.—ELECTRO-OPTICAL DISPLAY SYSTEM. AUG. 11, 1970.

3,588,584.—APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK. JUNE 28, 1971.

3,612,758.—COLOR DISPLAY DEVICE - REISSUED D 2717R. OCT. 12, 1971.

Class 17D 3

3,198,976.—ELECTRIC DISCHARGE TUBES AND APPLICATIONS THEREOF. AUG. 3, 1965.

3,264,638.—ELECTRONIC CODE TRANSLATION. AUG. 2, 1966. CAN. 0740559.

3,349,677.—ALPHA NUMERIC CHARACTER PRINTER. OCT. 31, 1967.

3,403,390.—MESSAGE STORAGE. SEPT. 24, 1968. GRB. 1078401.

3,861,804.—INFEROMETRY READOUT OF PHASE INFORMATION. JAN. 21, 1975. CAN. 0980745, GRB. 1387905.

3,898,377.—VIDEO MIXER. AUG. 5, 1975.

Class 17D 4

3,478,659.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. NOV. 18, 1969.

Class 17D 5

3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.

Class 17E

3,852,775.—MOVING BELT SCANNING PRINTER. DEC. 3, 1974.

4,027,961.—COPIER/PASTER SCAN APPARATUS. JUNE 7, 1977.

4,080,633.—TWISTING GEOMETRY SCANNER. MAR. 21, 1978.

Class 17E 1

3,337,718.—LIGHT SCAN RECORDING AND READOUT. AUG. 22, 1967. CAN. 0794443, GRB. 1070030.

3,426,144.—TRANSCEIVER APPARATUS FOR TRANSMITTING AND RECORDING OPTICAL INFORMATION. FEB. 4, 1969. CAN. 0810757, GRB. 1158568, JAP. 0579399.

3,426,354.—ELECTROSTATIC CHARGE IMAGE RECORDER. FEB. 4, 1969. AUS. 0295167, BEL. 0664729, CAN. 0739120, DNK. 0115269, FRA. 1455131, GER. 1280281, GRB. 1084494, HOL. 0136720, ITL. 0761085, JAP. 0492014, STZ. 0444906, SWD. 0338117.

3,548,195.—RADIATION SENSITIVE DOCUMENT SCANNING MEANS. DEC. 15, 1970. CAN. 0901968, FRA. 1592840, GER. 1809854, GRB. 1230836, ITL. 0848026, JAP. 0587941.

3,553,463.—RADIATION SENSITIVE DOCUMENT SCANNING APPARATUS USING HELICAL SCANNER. JAN. 5, 1971.

3,775,559.—APERTURE DESIGNS FOR FACSIMILE SCANNING APPARATUS. NOV. 27, 1973. CAN. 0960770, GRB. 1376189.

3,820,900.—INSTRUMENT FOR SCANNING DOCUMENT FOR QUALITY. JUNE 28, 1974.

3,867,571.—FLYING SPOT SCANNER. FEB. 18, 1975. CAN. 0995351.

3,898,470.—SCANNING ARRANGEMENT FOR MULTIFUNCTION OPERATION. AUG. 5, 1975.

3,922,485.—FLYING SPOT SCANNER WITH SCAN DETECTION. NOV. 25, 1975.

3,944,323.—VARIABLE SPOT SIZE SCANNING. MAR. 16, 1976. BEL. 0835552.

3,946,150.—OPTICAL SCANNER. MAR. 23, 1976.

3,962,538.—FLYING SPOT SCANNING SYSTEM WITH VIRTUAL SCANNERS. JUNE 8, 1976.

3,966,319.—FLAT FIELD SCREENING MIRROR. JUNE 29, 1976.

3,970,359.—FLYING SPOT FLAT FIELD SCANNER. JULY 20, 1976.

3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.

3,974,506.—SCANNING SYSTEM FOR IMAGING CHARACTERS COMBINED WITH GRAPHIC CURVES. AUG. 10, 1976.

3,997,721.—FLYING SPOT SCANNING SYSTEM WITH REDUCED SCAN ANGLE. DEC. 14, 1976.

4,006,299.—FLAT FILLED SCANNING SYSTEM. FEB. 1, 1977. BEL. 0836543.

4,012,585.—INPUT AND OUTPUT FLYING SPOT SCANNING SYSTEM. MAR. 15, 1977.

4,015,081.—MULTIFUNCTION SCANNING SYSTEM. MAR. 29, 1977. BEL. 0836790.

4,021,897.—A PROCESS FOR PROVIDING CEMENTED GLASS FLATS TO PROVIDE HIGH SPEED MULTIFACETED POLYGONAL SCAN. APR. 10, 1977.

4,034,408.—FLYING SPOT SCANNER. JULY 5, 1977. GRB. 1452300.

4,047,793.—POLYGON SCANNER WITH ANNULAR LIP. SEPT. 13, 1977.

4,052,715.—DIGITAL HALF-TONE GREY SCALE EXPANSION SYSTEM. OCT. 4, 1977.

4,067,639.—HOLOGRAPHIC SCANNING SPINNER. JAN. 10, 1978.

4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.

4,071,754.—BEAM ALIGNMENT DETECTOR. JAN. 31, 1978.

4,080,633.—TWISTING GEOMETRY SCANNER. MAR. 21, 1978.

4,092,632.—CROSSOVER ARRANGEMENT FOR MULTIPLE SCANNING ARRAYS. MAY 30, 1978.

4,093,350.—A SYSTEM FOR CENTRIFUGALLY CASTING A THIN FILM PLASTIC IN A REPLICA PROCESS FOR PROVIDING M. JUNE 6, 1978.

4,101,365.—PROCESS OF MAKING HIGH SPEED MULTIFACETED POLYGONAL SCANNERS. JULY 18, 1978.

Class 17E 2

3,407,329.—SCANNED CONVERSION TUBE. OCT. 22, 1968. CAN. 0836783, GER. 1639461, GRB. 1190967, JAP. 0565840.

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GER. 1597879, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.

3,474,417.—FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE. OCT. 21, 1969. CAN. 0869188, GER. 1549144, GRB. 1203095, JAP. 0568732.

3,523,188.—SEMICONDUCTOR CURRENT CONTROL DEVICE AND METHOD. AUG. 4, 1970.

Class 17E 3

3,485,945.—ELECTRONIC LENTICULAR RECORDING SYSTEM. DEC. 23, 1969.

3,510,570.—ELECTRONIC LENTICULAR DISPLAY SYS. MAY 5, 1970.

3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.

3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.

3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

3,853,387.—VARIABLE MAGNIFICATION LENS ASSEMBLY HAVING TWO ADD LENSES. DEC. 10, 1974.

3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.

Class 17E 4

3,279,342.—COMMUNICATION PRINTER. OCT. 18, 1966. CAN. 0767902, GRB. 1120446, JAP. 0698291.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,963,343.—CAMMING SYSTEMS. JUNE 15, 1976. BEL. 0824049.
4,006,648.—CAMMING SYSTEM. FEB. 8, 1977. BEL. 0824049.
4,054,359.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR USING PULLEYS. OCT. 18, 1977.
4,067,640.—APPARATUS FOR SYNCHRONOUSLY SCANNING A FLAT PLATEN WITH A ROTATING MIRROR. JAN. 10, 1978.

Class 17E 5

3,155,022.—BUFFER FOR ELECTRONIC DISPLAY READOUT. NOV. 3, 1964. CAN. 0773751, GRB. 1056114, JAP. 0542586.
3,219,993.—IMAGE FORMATION AND DISPLAY UTILIZING A THERMOTROPICALLY COLOR REVERSIBLE MATERIAL. NOV. 23, 1965. CAN. 0762159, GER. 1222795, ITL. 0753655, JAP. 0474129.
3,249,757.—THERMAL IMAGING DEVICE. MAY 3, 1966.
3,995,278.—SUPERCONDUCTIVE MAGNETOSTATIC PRINTER. NOV. 30, 1976.

Class 17E 6

3,456,074.—IMAGE STABILIZATION OF OPTICAL IMAGING SYSTEMS. JULY 15, 1969.
3,461,227.—MECHANICAL JITTER EQUALIZER. AUG. 12, 1969. CAN. 0824819, GRB. 1198303.
3,873,189.—ADJUSTABLE-POSITION OPTICAL SYSTEM. MAR. 25, 1975.

Class 17F 1

3,325,674.—MOVING TARGET DISPLAY INDICATOR. JUNE 13, 1967.
3,340,419.—ELECTRIC DISCHARGE TUBES. SEPT. 5, 1967. CAN. 0773690.
3,447,026.—CRT SCAN STABILIZER. MAY 27, 1969. GER. 1490986.
3,483,414.—STORG TUBE HVG FLD EFF LAYR W/ CONDCTG PINS EXT TO LAYR THAT READOUT NOT ERASE CHG PATTERN. DEC. 9, 1969. CAN. 0850846, GER. 1537566, GRB. 1203432, JAP. 0565841.

Class 17F 2

3,153,785.—TIME COMPRESSED DISPLAY. OCT. 20, 1964. CAN. 0708306, GRB. 1008993.
3,579,024.—SELECTIVE BLANKING CONTROL CIRCUIT. MAY 18, 1971.

Class 17G

3,619,714.—PANEL DISPLAY DEVICE. NOV. 9, 1971.
4,003,742.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. JAN. 18, 1977.

Class 17G 1

3,459,946.—SOLID STATE STORAGE DEVICE. AUG. 5, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,539,862.—DUAL CONDUCTOR STORAGE PANEL. NOV. 10, 1970. ARG. 0175067, AUS. 0414034, BEL. 0723721, CAN. 0878168, FRA. 1591040, GER. 1808238, GRB. 1235310, HOL. 0150616, ITL. 0847618, JAP. 0742515, MEX. 0111871, SPN. 0360366, STZ. 0493930, SWD. 0345341, VZL. 0023718.
4,002,998.—EXTERNALLY CONTROLLABLE MINIATURE LASERS. JAN. 11, 1977.
4,085,321.—MULTIPHASE PHOTOACTIVATED SWITCH. APR. 18, 1978.

Class 17G 2

3,531,647.—DEVICE AND PROCESS FOR REDUCTION OF BACKGROUND LIGHT IN SOLID STATE STORAGE PANELS. SEPT. 29, 1970. CAN. 0862333, FRA. 1540063, GER. 1549143, GRB. 1201375, ITL. 0818126, MEX. 0101197.
3,531,648.—SOLID STATE STORAGE PANEL FOR COLOR REPRODUCTION. SEPT. 29, 1970. CAN. 0846433, GRB. 1201377.
3,540,008.—SOLID STATE STORAGE DEVICES HAVING NON-CORONA EXTINCTION CAPABILITY. NOV. 10, 1970. ARG. 0166245, AUS. 0424286, BEL. 0725616, CAN. 0897827, FRA. 1599275, GER. 1815243, GRB. 1250023, ITL. 0849327, JAP. 0742516, MEX. 0106020, SPN. 0361652, STZ. 0504755, SWD. 0361123, VZL. 0023729.
3,561,964.—METHOD FOR PRODUCTION OF SOLID STATE STORAGE PANELS. FEB. 9, 1971. ARG. 0184633, AUS. 0427883, BEL. 0736077, CAN. 0866994, FRA. 6924001, GER. 1935763, GRB. 1270845, HOL. 0150271, ITL. 0870080, JAP. 0681942, MEX. 0113574, SPN. 0369656, STZ. 0513430, SWD. 0358991, VZL. 0023743.
3,594,610.—DISPLAY PANEL WITH CORONA DISCHARGE CONTROL. JULY 20, 1971.

Class 17G 3

3,154,636.—THREE DIMENSIONAL DISPLAY DEVICE. OCT. 27, 1964. CAN. 0794989, GRB. 1029611, JAP. 0462394.
3,205,403.—ELECTROLUMINESCENT DISPLAY SYSTEMS. SEPT. 7, 1965.
3,221,335.—ELECTRO-OPTICAL RECORDING AND VISUAL DISPLAY SYSTEMS. NOV. 30, 1965. AUS. 0226551, CAN. 0801882, FRA. 1202340, GER. 1107705, GRB. 0880692, JAP. 0306714.
3,989,355.—ELECTRO-OPTIC DISPLAY SYSTEM. NOV. 2, 1976.

Class 17G 4

3,293,441.—IMAGE INTENSIFIER WITH FERRO-ELECTRIC LAYER AND BALANCED IMPEDANCES. DEC. 20, 1966.
3,300,645.—FERROELECTRIC IMAGE INTENSIFIER INCLUDING INVERSE FEEDBACK MEANS. JAN. 24, 1967.
3,440,428.—IMAGE CONVERTER USING CHARGED PHOTOEMISSIVE LAYER. APR. 22, 1969. CAN. 0858119, GER. 1639462, GRB. 1202049, JAP. 0565839.
3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.
3,531,646.—ENHANCEMENT OF ELECTROSTATIC IMAGES. SEPT. 29, 1970. CAN. 0892186, GRB. 1199462, JAP. 0641476.
3,543,032.—DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE. NOV. 24, 1970. ARG. 0177440, CAN. 0880586, MEX. 0111518, PNM. 0001809, VZL. 0027508.

Class 17H

3,742,281.—CONTROLLED SPECTRUM FLASH LAMP. JUNE 26, 1973.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,995,110.—FLYING SPOT SCANNER WITH PLURAL LENS CORRECTION. NOV. 30, 1976.
4,021,845.—A LASER FOR GENERATING WHITE LIGHT. MAY 3, 1977. BEL. 0846954.
4,040,096.—FLYING SPOT SCANNER WITH RUNOUT CORRECTION. AUG. 2, 1977.
4,065,731.—TANDEM LASER ASSEMBLY. DEC. 27, 1977.

4,084,197.—FLYING SPOT SCANNER WITH SCAN DETECTION. APR. 11, 1978.

Class 17H 1

3,427,564.—HIGH-POWER IONIZED GAS LASER STRUCTURE. FEB. 11, 1969.
3,437,950.—ION LASER HAVING A METAL TUBE SHRINK-FITTED ONTO THE CERAMIC DISCHARGE TUBE. APR. 8, 1969.
3,523,256.—HEAT PUMPED LASER. AUG. 4, 1970.
3,529,261.—LASR HVNG ACTV MEDIUM WHCH IS AN EXCTD HALOGN WHSE LOWR ENRGY ST IS DEPLETD BY REACTNG W/ALKAL. SEPT. 15, 1970. CAN. 0816276, FRA. 1446601, GER. 1299367, GRB. 1124346, ITL. 0726918.
3,562,173.—LASER MATERIALS. FEB. 9, 1971.
3,860,888.—TIME-SHARING TWO FREQUENCY LASER. JAN. 14, 1975.
3,954,534.—LIGHT EMITTING DIODE ARRAY WITH DOME GEOMETRY. MAY 4, 1976.
3,969,686.—BEAM COLUMNATION USING MULTIPLE COUPLED ELEMENTS. JULY 13, 1976.
3,970,958.—ELECTRICALLY PUMPED SOLID-STATE DISTRIBUTED FEEDBACK LASER WITH PATICULAR GRATING SPACING. JULY 20, 1976. BEL. 0834484.
3,978,428.—BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. AUG. 31, 1976.
4,006,432.—INTEGRATED GRATING OUTPUT COUPLER IN DIODE LASERS. FEB. 1, 1977. BEL. 0834480.
4,023,993.—METHOD OF MAKING AN ELECTRICALLY PUMPED SOLID STATE DISTRIBUTED FEEDBACK LASER. MAY 17, 1977. BEL. 0832000, SPN. 0440361.
4,033,796.—METHOD OF MAKING BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. JULY 5, 1977.
4,045,749.—CORRUGATION COUPLED TWIN GUIDE LASER. AUG. 30, 1977.
4,052,680.—METAL VAPOR LASER HAVING CAPTAPHORESIS MEANS. OCT. 4, 1977.
4,063,189.—LEAKY WAVE DIODE LASER. DEC. 13, 1977.
4,099,999.—METHOD OF MAKING ETCHED-STRIPED SUBSTRATE PLANAR LASER. JULY 11, 1978.

Class 17H 2

3,296,541.—BROADBND TRVLNG WAVE MASER W/BOTH MASER AND ISOLATOR CRYSTALS CUT ATDFRNT ANGLES TO OPTICAL AXIS. JAN. 3, 1967.
3,983,509.—DISTRIBUTED FEEDBACK DIODE LASER. SEPT. 28, 1976.

Class 17H 3

3,258,597.—LASER HETERODYNE COMMUNICATION SYSTEM. JUNE 28, 1966.
3,465,166.—FAR INFRA-RED COHERENT LIGHT GENERATOR. SEPT. 2, 1969.
3,499,159.—POLYCHROMATIC LASER AEROSOL SIZING AND RANGING-PLASAR-TECHNIQUE. MAR. 3, 1970.
3,500,236.—LASER STABILIZING SYSTEM. MAR. 10, 1970.
3,534,289.—LASER SYSTEM WITH OPTICAL DISCRIMINATOR. OCT. 13, 1970.
3,753,144.—GAS LASER STRUCTURE. AUG. 14, 1973.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
4,012,776.—LUMINESCENT SCREEN LASER SCANNING TECHNIQUE. MAR. 15, 1977.
4,070,089.—TWO DIMENSIONAL LASER SCANNER WITH MOVABLE CYLINDER LENS. JAN. 24, 1978.
4,100,408.—SIGNAL GENERATOR FOR RASTER TYPE SCANNERS. JULY 11, 1978.

Class 17I

3,630,598.—OPTICAL DEMODULATION FILTER. DEC. 28, 1971. BEL. 0761134, CAN. 0904628, GRB. 1330709, ITL. 0914073, JAP. 0770139.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,687,535.—OPTICAL DEMODULATION SYSTEM. AUG. 29, 1972. BEL. 0762859, CAN. 0944075, FRA. 7105649, GRB. 1343483, ITL. 0918450.
3,689,267.—SCREEN MAKING PROCESS UTILIZING ROTATION OF OPTICAL PLATE. SEPT. 5, 1972. CAN. 0950736.
3,697,184.—APPARATUS FOR EVALUATING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1003484, GRB. 1389471.
3,776,995.—METHOD OF PRODUCING X-RAY DIFFRACTION GRATING. DEC. 4, 1973. CAN. 0944871, GRB. 1363262.
4,066,335.—VARIABLE DENSITY LENS. JAN. 3, 1978.

Class 17I 1

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.

Class 17I 2

3,416,865.—OPTICAL DENSITY MEASURING SYSTEM. DEC. 17, 1968.
3,609,047.—SINGLE BEAM PHOTOMETER SYSTEM WHEREIN THE ABSORBANCE OF A SAMPLE IS DETERMINED RELATIVE TO REFE. SEPT. 28, 1971.
4,054,391.—SPECULAR REFLECTANCE MICRODENSITOMETER. OCT. 18, 1977.

Class 17I 3

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.

Class 17J

D.236,733.—CURSOR POSITION CONTROLLER. SEPT. 9, 1975.
3,447,030.—COLD SEAL LAMP PRESSURE REGULATION. MAY 27, 1969.
3,642,377.—COLOR PRINTING SYSTEM. FEB. 15, 1972.
3,733,123.—METHOD AND APPARATUS FOR ENCLOSING A LAMP. MAY 15, 1973. ARG. 0198292, AUS. 0466394, BEL. 0789338, FRA. 7234198, GRB. 1410046, ITL. 0967625, MEX. 0128585, SPN. 0409972, STZ. 0549825, SWD. 0360935.
3,775,006.—APPARATUS FOR OPTICAL COLOR SEPARATION. NOV. 27, 1973.
3,795,805.—APPARATUS FOR TESTING A CREDIT CARD. MAR. 5, 1974.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,892,963.—TRANSDUCER FOR A DISPLAY-ORIENTED POINTING DEVICE. JULY 1, 1975. FRA. 7440265.
3,915,553.—ELECTROOPTIC COLOR FILTER SYSTEM. OCT. 28, 1975.
3,936,179.—SUPPORT STRUCTURE FOR A DUPLICATOR OPTICAL SYSTEM. FEB. 3, 1976.
3,951,521.—REVERSIBLE RADIANT ENERGY FILTER AND PROCESS OF USING SAME. APR. 20, 1976.
3,977,785.—METHOD & APP FOR INHIBITING THE OPERATION OF A COPYING MACHINE. AUG. 31, 1976.
4,071,323.—DIFFUSION CRUCIBLE AND SLAB MEMBER WITH COMMON METAL COMPONENT IN THE VAPOR PHASE. JAN. 31, 1978.
4,071,396.—CONTROLLED ATMOSPHERE PROCESS FOR ALTERING THE NONSTOICHIOMETRY OF CRYSTALLINE MEMBERS. JAN. 31, 1978.

Class 18

2,578,677.—METHOD OF MAKING PHOTOGRAPHIC SENSITIZING DYES. DEC. 18, 1951.
3,736,133.—TRANSPARENT INK - ABSORBENT LAQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583. GRB. 1390137, MEX. 0127276. VZL. 0033577.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.
4,080,332.—ELECTRICALLY CONDUCTIVE COMPOUNDS. MAR. 21, 1978.

Class 18A

2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,402,177.—SUBSTITUTED 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRPOCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 1155986, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.
3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUCRESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965. JAP. 0586923.
3,562,248.—BISAZC FGMTS DRVD CPLRS CBTC CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.
3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, JAP. 0683893, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.
3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.
3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.
3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651. VZL. 0029342.
3,694,201.—METHOD FOR PHOTOCONDUCTIVE POWDER. SEPT. 26, 1972. BEL. 0777717, CAN. 0982808, FRA. 7201003, GRB. 1381162, ITL. 0946352.
3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.
3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, CAN. 0995211, GRB. 1395769, ITL. 0955643, MEX. 0131970, VZL. 0034272.
3,837,850.—PHOTOCONDUCTIVE BUTILE TITANIUM DIOXIDE. SEPT. 24, 1974.
3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.
3,905,958.—SELENIUM COMPOUNDS. SEPT. 16, 1975.
3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.
4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.
4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.
4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.
4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.
4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.
4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.
4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.
4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.
4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.
4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.
4,047,947.—PROCESS FOR THE PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENI. SEPT. 13, 1977.
4,075,012..—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.
4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

Class 18A 1

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.
3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MITS IN ELCPHG. JUNE 3, 1969.
3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.
3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

Class 18A 2

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.
3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.
3,509,146.—PROCESS OF PREPARING PHTHALOCYANINE AND HETEROCYCLIC ANALOGUES. APR. 28, 1970. CAN. 0865117, GRB. 1232241, JAP. 0587395.
3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PLD. 0082204, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.
3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A 2A

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.
3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.
3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, JAP. 0820183, MEX. 0115884, VZL. 0024012.
3,862,127.—PROCESS. JAN. 21, 1975. AUS. 0453518, BEL. 0754407, FRA. 7028418, GRB. 1268574, ITL. 0929169, JAP. 0727963, SPN. 0382366.
3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.
3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.
3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.
3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.
4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.
4,098,795.—METHOD FOR THE PREPARATION OF X-FORM METAL FREE PHTHALOCYAMINE. JULY 4,

1978. ARG. 182328, BEL. 737989, CAN. 899870, FRA. 6928871, GER. 1943381, GRB. 1280843, ITL. 870314, JAP. 654041, MEX. 116011.

Class 18A 3

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8, 13-DIOXODINAPHTHO-2-1-B, 2, 3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

Class 18A 4

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

Class 18B

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041. MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.

3,725,505.—PYRENE CONTAINING POLYMERS PREPARED BY ANIONIC POLYMERIZATION. APR. 3, 1973. ARG. 0183776, AUS. 0459733, BEL. 0770501, CAN. 0986650, FRA. 7127963, GRB. 1359045, ITL. 0930707, MEX. 0120152, SPN. 0393582, VZL. 0031959.

3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOROETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 7408936, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975. FRA. 7403086, GRB. 1446966.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,883,488.—2-VINYL-9-DICYANOMETHYLENE-FLUORENE AND DERIVATIVES THEREOF. MAY 13, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 099593, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382..

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975. ITL. 1010430.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,994,994.—IMPROVED PROCESS FOR PREPARATION OF BLOCK COPOLYMERS FROM VINYLCARBOZOLES & OTHER ADDITION MONO. NOV. 30, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,009,151.—POLYMERS OF 2-VINLYFLUORENONE AND DERIVATIVES THEREOF. FEB. 22, 1977.

4,011,266.—2-VINYL-FLUORENONE AND DERIVATIVES THEREOF. MAR. 8, 1977.

4,045,413.—POSSIBLE ACTIVE MATRIX POLYMERS. AUG. 30, 1977. FRA. 7432710.

4,046,564.—ELECTROPHOTOGRAPHIC IMAGING MEMBERS WITH PHOTOCONDUCTIVE LAYER CONTAINING ELECTRON ACCEPTOR. SEPT. 6, 1977.

4,071,670.—METHOD OF SIZING MONOMER DROPLETS FOR SUSPENSION POLYMERIZATION TO FORM SMALL PARTICLES. JAN. 31, 1978. BEL. 857223.

4,075,012.—INTRACHAIN CHARGE TRANSFER COMPLEXES USE IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 21, 1978.

4,098,984.—ELECTRON ACCEPTOR POLYMERS. JULY 4, 1978.

Class 18C

4,074,143.—OPTOELECTRONIC DEVICE WITH OPTICAL FEEDBACK. FEB. 14, 1978. FRA. 7631992.

Class 18C 1

RE.27,480.—AUTOMATIC DEVELOPMENT CONTROLLER -RE OF 3,376,854-D986. SEPT. 19, 1972.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835. BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 18C 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.

2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149. USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

4,051,077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 18C 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 0032708, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062. PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 33998, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977

4,051077.—NON FILMING DUAL ADDITIVE DEVELOPER. SEPT. 27, 1977. AUS. 487989, BEL. 825924, FRA. 7505307, GRB. 1494360, SPN. 435074.

Class 18C 2

4,038,076.—ELECTROSTATOGRAPHIC DEVELOPMENT. JULY 26, 1977. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD 7216977.

Class 18C 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

2,788,288.—RHEINFRANK 0000 JJ 0000 JONES 0000 WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.

2,940,934.—ELECTROSTATIC DEVELOPER COMPOSITION & METHOD THEREFOR — SEE D670 FOR RE25136. JUNE 14, 1960.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2A 2

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710. LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX EXPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155. SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 18C 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 18C 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978. SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIER PARTICLES. AUG. 19, 1975. CAN. 1007923.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

4,019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977

4,040,969.—HIGH SURFACE AREA CARRIER. AUG. 9, 1977. BEL. 829639, GRB. 1497732, SPN. 438084.

4,042,517.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER. AUG. 16, 1977.

4,065,585.—RENEWABLE CHOW FUSER COATING. DEC. 27, 1977. GRB. 1490252.

4,066,563.—COPPER - TETRA - 4 - (OCTADECYLSULFONOM- IDO) PHTHALOCYANINE ELECTROPHOTOGRAPHIC CARRIER. JAN. 3, 1978.

Class 18C 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

3,910,846.—METHOD OF PREPARING ELECTROSCOPIC TONER PARTICLES. OCT. 7, 1975. CAN. 0984074.

3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128768, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

Class 18C 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.

3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

Class 18C 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.

3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 18C 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.

3,790,485.—PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER. FEB. 5, 1974.

3,812,037.—LIQUID DEVELOPER COMPOSITION. MAY 21, 1974.

Class 18C 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.

3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.

3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.

3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.

3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.

3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.

3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 18C 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260. FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.

3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.

3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.

3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.

3,830,750.—ENCPSLTNG SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL.

0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,936,517.—METHOD FOR REDUCING PARTICLE SIZE. FEB. 3, 1976.
4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.
4,071,670.—METHOD OF SIZING MONOMER DROPLETS FOR SUSPENSION POLYMERIZATION TO FORM SMALL PARTICLES. JAN. 31, 1978. BEL. 857223.
4,077,804.—METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS. MAR. 7, 1978.
4,097,620.—MAGNETIC TONER PARTICLE COATING PROCESS. JUNE 27, 1978.

Class 18D

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,959,934.—COMPOSITION AND METHOD FOR REPAIRING SELENIUM PHOTORECEPTOR. JUNE 1, 1976.
3,971,169.—A METHOD FOR REPAIRING SELENIUM PHOTOCONDUCTORS. JULY 27, 1976.
4,062,658.—COMPOSITION & METHOD FOR REPAIRING SELENIUM PHOTORECEPTORS. DEC. 13, 1977.

Class 18E

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 20

3,916,167.—COUNTERS. OCT. 28, 1975.

Class 20A

3,751,693.—MOVING COIL MOTOR WITH NO SPRAY FLUX. AUG. 7, 1973. AUS. 3467604, BEL. 0795400, CAN. 0980395, GRB. 1424622, ITL. 0979062, SPN. 0411470.
3,769,467.—VIBRATION DAMPED TRANSDUCER HEAD ASSEMBLY. OCT. 30, 1973. ARG. 0195905, AUS. 0476996, BEL. 0795401, CAN. 0995355, GRB. 1417764, ITL. 0979063, MEX. 0135598, SPN. 0411538, STZ. 0558582, SWD. 7301915.
4,046,105.—LAMINAR DEEP WAVE GENERATOR. SEPT. 6, 1977.
4,076,417.—INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE. FEB. 28, 1978. HAT. 1604.

Class 20A 1

RE.27,313.—BELT TRACKING SYSTEM - RE OF 3,500,694-D2586. MAR. 21, 1972.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, USR. 0321984, VZL. 0023676.
3,500,694.—BELT TRACKING SYSTEM — SEE D3286 FOR RE27313. MAR. 17, 1970.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.

Class 20A 2

2,022,891.—PHOTOCOPY MACHINE. DEC. 3, 1935.
3,498,148.—CHAIN TRAIN. MAR. 3, 1970.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,844,179.—GEAR DRIVE FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. OCT. 29, 1974. ARG. 203483, BEL. 0816382, CAN. 1007075, GRB. 1467714, STZ. 5786990, VZL. 0033061.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976
3,985,277.—WEB HANDLING DEVICE. OCT. 12, 1976.

Class 20A 3

2,069,318.—PHOTOCOPY MACHINE. FEB. 2, 1937.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,505,716.—ROLL APPARATUS. APR. 14, 1970.
3,791,243.—METHOD AND APPARATUS FOR FORMING EDGES OF AN ENDLESS BELT. FEB. 12, 1974.
3,932,177.—COLLAR AND METHOD OF MAKING SAME. JAN. 13, 1976.

Class 20A 4

3,329,029.—OFF-CENTER LOAD MOVING ASSEMBLY. JULY 4, 1967.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,777,578.—LINEAR ACTUATOR. DEC. 11, 1973. CAN. 9783901.

Class 20A 5

2,025,371.—APPARATUS FOR TREATING PHOTOGRAPHIC FILM. DEC. 24, 1935.
3,112,819.—CLUTCH MECHANISM - 914. DEC. 3, 1963. CAN. 0688810.
3,213,645.—TORQUE LIMITING MECHANISM. OCT. 26, 1965. CAN. 0729978, GRB. 1035547, JAP. 0548690.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,686,974.—MECHANICAL DRIVE ARRANGEMENT. AUG. 29, 1972.

Class 20A 6

3,351,831.—MOTOR SPEED CONTROL UTILIZING LIGHT SENSITIVE CONDUCTIVE AND RESISTIVE ELEMENTS. NOV. 7, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,870,934.—WEB TENSION CONTROLLER. MAR. 11, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,917,400.—METHOD & APPARATUS FOR MAINTAINING A PREDETERMINED PHASE RELATIONSHIP BETWEEN TWO SIGNALS. NOV. 4, 1975.
3,921,043.—METHOD & APPARATUS FOR MAINTAINING SUBSTANTIALLY CONSTANT TORQUE IN A WEB TRANSPORT APPARATUS. NOV. 18, 1975.
3,944,896.—PHASE SYNCHRONIZATION SYSTEM WITH START-UP SEQUENCING AND AUTOMATIC SHUTDOWN. MAR. 16, 1976.
3,991,355.—STEPPER MOTOR CONTROL NOV. 9, 1976.

Class 20B

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
4,040,827.—DEVELOPMENT IMAGING METHODS. AUG. 9, 1977.

Class 20B 1

2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

Class 20B 2

2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,477,568.—ELECTROSTATIC SEPARATION OF ROUND AND NONROUND PARTICLES. NOV. 11, 1969.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,694,068.—ROLLER RETRACTION MECHANISM IN A MULTIPLE ROLLER BELT ASSEMBLY. SEPT. 26, 1972. CAN. 0946322, GRB. 1370798.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.
3,702,131.—BELT TRACKING SYSTEM. NOV. 7, 1972. ARG. 1949380, AUS. 0459379, BEL. 0777321, CAN. 0953673, FRA. 7147892, GRB. 1381720, ITL. 0944435, MEX. 0126336, PNM. 0002633, SPN. 0398380.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 20B 3

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,662,884.—METHOD AND APPARATUS FOR ELECTROSTATICALLY CLASSIFYING TONER PARTICLES. MAY 16, 1972. CAN. 0956273, GRB. 1327942.
3,740,735.—AIR CIRCULATION APPARATUS. JUNE 19, 1973. CAN. 1014265, GRB. 1322612, JAP. 0840915.
3,909,383.—CLEANING PROCESS. SEPT. 30, 1975. CAN. 0905883.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20 C

1,928,106.—SPRING TENSION DEVICE. SEPT. 26, 1933.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.

Class 20C 1

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

Class 20C 2

3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,723,980.—TEMPERATURE COMPENSATION SYSTEM FOR MAGNETIC DISK MEMORY UNIT. MAR. 27, 1973. ARG. 0195985, AUS. 0471633, BEL. 0791363, FRA. 7240560, GRB. 1408778, ITL. 0970913, MEX. 0129694, SPN. 0408629, STZ. 0028456, SWD. 7214693, VZL. 0032424.

Class 20C 3

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

Class 20C 4

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.

Class 20C 5

3,216,247.—WIND-MEASURING METER DEVICE. NOV. 9, 1965.

Class 20C 6

3,502,163.—EQUAL ARM BALANCE WITH C-SHAPED FULCRUM SLEEVE FORMED ON BEAM. MAR. 24, 1970.
3,583,505.—SPRING SCALE. JUNE 8, 1971. CAN. 0902123, GRB. 1295477.
3,878,358.—DIGITAL POWER CONTROL. APR. 15, 1975.

Class 20C 7

2,558,773.—APPARATUS FOR CONTROLLING THE THICKNESS OF A COATING ON A TRAVELING WEB. JULY 3, 1951.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

Class 20D

2,179,164.—ATTACHMENT FOR PHOTOCOPY MACHINES. NOV. 7, 1939.
2,429,896.—LENS ADJUSTING MEANS FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
3,746,502.—EVAPORATION CRUCIBLE. JULY 17, 1973. GRB. 1411236.
3,765,638.—SUCTION MOUNT. OCT. 16, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

Class 20D 1

1,962,050.—ATTACHMENT FOR PHOTOGRAPHIC PRINT TREATING APPARATUS. JUNE 5, 1934.
1,977,753.—FILM TREATING APPARATUS. OCT. 23, 1934.
1,992,492.—PHOTOCOPY MACHINE. FEB. 26, 1935.
1,998,324.—PHOTOCOPY MACHINE. APR. 16, 1935.
2,019,788.—PHOTOCOPY MACHINE. NOV. 5, 1935.
2,035,558.—PHOTOCOPY MACHINE. MAR. 31, 1936.
2,050,956.—PHOTOCOPY MACHINE. AUG. 11, 1936.
2,163,451.—COPY HOLDER FOR PHOTOCOPY MACHINES. JUNE 20, 1939.
2,223,767.—MACHINE FOR FEEDING PHOTOGRAPHIC PAPER. DEC. 3, 1940.
2,430,687.—PAPER FEEDING MECHANISM FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,379,855.—FLUID FEED SYSTEM. APR. 23, 1968.
3,407,018.—TWO-AXIS ANGULAR POSITIONING APPARATUS FOR ADJUSTING THE POSITION OF AN OPTICAL ELEMENT. OCT. 22, 1968.
3,436,071.—WORK HOLDER. APR. 1, 1969. CAN. 0856095, GRB. 1174795, JAP. 0642773.
3,440,859.—CORNER FORMING APPARATUS. APR. 29, 1969. CAN. 0866532.
3,475,936.—TRANSPORT SYSTEM. NOV. 4, 1969. GRB. 1179749.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,901,647.—LOW RADIATION OPEN-BOAT CRUCIBLES. AUG. 26, 1975.
4,016,470.—TRANSDUCER BORING SYSTEM. APR. 5, 1977.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.

Class 20D 2

3,056,967.—FASTENER DRIVING TOOL. OCT. 9, 1962.
3,091,578.—MECHANICAL BONDING LOCK. MAY 28, 1963.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,876,317.—LATCH MECHANISM. APR. 8, 1975. CAN. 1005486.

Class 20D 3

3,258,281.—HERMETIC SEALED COUPLING FOR CONDUITS. JUNE 28, 1966.
3,317,224.—FLANGED PIPE COUPLING HAVING METALLIC SEAL MEANS. MAY 2, 1967.
3,366,343.—DEVICE FOR FASTENING A SHAFT TO A REEL. JAN. 30, 1968.
3,604,737.—METHOD OF JOINING MATERIALS. SEPT. 14, 1971.

Class 20D 4

3,532,863.—DYNAMIC CAM TESTER. OCT. 6, 1970. CAN. 0835529.
3,843,233.—ALIGNING AGENT FOR LOWRNG THRSHLD VOLTG REQUIRD TO EFFECT OPTCLY NEQTV TO OPTCLY POSITIVE PHASE. OCT. 22, 1974.

Class 20D 5

3,596,316.—BLOW MOLDING APPARATUS. AUG. 3, 1971.

Class 20D 6

3,384,107.—BAKEABLE VACUUM VALVE. MAY 21, 1968.

Class 20D 7

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

Class 20E

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.

Class 20F

3,390,693.—PURE FLUID AMPLIFIER. JULY 2, 1968.
3,413,993.—FLUID DEVICE. DEC. 3, 1968.
3,417,770.—FLUID AMPLIFIER SYSTEM. DEC. 24, 1968.
3,459,205.—MAGNETICALLY CONTROLLED FLUID AMPLIFIER. AUG. 5, 1969.
3,496,955.—ELECTRICALLY ACTUATED BISTABLE FLUID AMPLIFIER. FEB. 24, 1970.
3,726,588.—WEB TRACKING SYSTEM. APR. 10, 1973.

Class 20 G

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.
3,549,059.—TRIGGERING APPARATUS AND WORK LOCATING MEANS FOR AEROSOL SPRAY CANS. DEC. 22, 1970.
3,555,725.—SELF-TRAVELLING WHEEL. JAN. 19, 1971. CAN. 0900718, GRB. 1289331, JAP. 0713807.
3,688,415.—VIBRATION DEMONSTRATION. SEPT. 5, 1972.
3,747,589.—REACTION TIME TESTING APPARATUS. JULY 24, 1973.
3,818,391.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATOGRAPHIC MACHINE. JUNE 18, 1974. CAN. 1010107.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
3,941,006.—FREE FLOATING BELT TENSIONER. MAR. 2, 1976.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,982,753.—COMBINED BACKSTOP & BRAKE-COMBINED BACKSTOP & BRAKE FOR ALBERT. SEPT. 28, 1976. BEL. 0812180, CAN. 1004161, FRA. 7407806, GRB. 1443088.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.
4,040,157.—DRUM SUPPORT APPARATUS. AUG. 9, 1977.
4,040,678.—BEARING ASSEMBLY. AUG. 9, 1977.

Class 21

D.240,557.—TRAY RACK. JULY 13, 1976.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
D245,667.—WIRE CUTTER. SEPT. 6, 1977.

Class 21A

3,905,400.—ELECTROFORMING MANDREL. SEPT. 16, 1975.
4,067,782.—METHOD OF FORMING AN ELECTROFORMING MANDREL. JAN. 10, 1978.

Class 21A 1

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,505,177.—ELECTROFORMING PROCESS. APR. 7, 1970.
3,520,780.—MAGNESIUM ELECTRODEPOSITION. JULY 14, 1970.
3,844,906.—DYNAMIC BATH CONTROL PROCESS. OCT. 29, 1974. BEL. 0799236, FRA. 7316539, GRB. 1421818.
3,853,614.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. DEC. 10, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,876,510.—PROCESS FOR ELECTROFORMING A FLEXIBLE BELT. APR. 8, 1975.
3,905,685.—ZOOM LENS FOR FIXED CONJUGATES. SEPT. 16, 1975. CAN. 0995039, GRB. 1451781.
3,954,568.—ELECTROFORMING AN ENDLESS FLEXIBLE SEAMLESS XEROGRAPHIC BELT. MAY 4, 1976. ARG. 0185811, AUS. 0449005, BEL. 0762249. CAN. 0889781, EGR. 0094306, FRA. 7103844, GRB. 1288717, HUN. 0169866, ITL. 0918048, MEX. 0119465, PLD. 0081712, PNM. 0002384, SPN. 0387636, STZ. 0521612, SWD. 0360753, TIW. 0007843, VZL. 0027666.
3,959,109.—METHOD AND APPARATUS FOR ELECTROFORMING. MAY 25, 1976.
3,963,587.—PROCESS FOR ELECTROFORMING NICKEL FOILS. JUNE 15, 1976.
4,043,876.—METHOD AND APPARATUS FOR ELECTROFORMING. AUG. 23, 1977.

Class 21A 2

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,577,323.—HIGH QUALITY SUBMASTERS. MAY 4, 1971.
3,927,463.—METHOD OF MAKING A CYLINDRICALLY SHAPED, HOLLOW ELECTROFORMING MANDREL. DEC. 23, 1975.
3,950,839.—ELECTROFORMING MANDREL. APR. 20, 1976.

Class 21A 3

3,352,482.—ION SPUTTER PUMPING COLLECTOR. NOV. 14, 1967.
3,437,568.—APPARATUS AND METHOD FOR DETERMINING AND CONTROLLING STRESS IN AN ELECTROFORMED PART. APR. 8, 1969.
3,799,859.—ELECTROFORMING SYSTEM. MAR. 26, 1974. GRB. 1427544.
4,043,876.—METHOD AND APPARATUS FOR ELECTROFORMING. AUG. 23, 1977.

Class 21B

3,223,878.—METHOD OF FABRICATING FINE GRIDS. DEC. 14, 1965.
3,276,919.—PROCESS FOR FORMING METAL STRUCTURES HAVING VERY FINE PORES. OCT. 4, 1966.
3,360,347.—PRODUCTION OF POUROUS MATERIALS. DEC. 26, 1967.
3,494,748.—OXIDATION RESISTANT COATING AND ARTICLE. FEB. 10, 1970.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,703,306.—METHOD OF HERMETICALLY SEALING SILICON TO A LOW EXPANSION ALLOY. NOV. 21, 1972.
3,740,830.—BRAZING CERAMICS. JUNE 26, 1973.
3,825,724.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER. JULY 23, 1974. CAN. 0995295, GRB. 1406047.
3,851,985.—COLLAR AND METHOD OF MAKING SAME. DEC. 3, 1974.
3,885,923.—GENERATION OF CURVED SURFACES ON A WORKPIECE. MAY 27, 1975.
3,911,163.—SOLDER COATING PROCESS AND APPARATUS. OCT. 7, 1975.
4,083,323.—PNEUMATIC SYSTEM FOR SOLDER LEVELING APPARATUS. APR. 11, 1978.

Class 21C

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

Class 22

D244,280.—SORTER WITH BIN INDICATOR. MAY 10, 1977.

D247,243.—SORTER CONTROLLER. FEB. 14, 1978.

Class 22A

2,771,002.—APPARATUS FOR USE WITH XEROGRAPHIC X-RAY POWDER IMAGES. NOV. 20, 1956. CAN. 0545947.

3,473,388.—ISOKINETIC PARTICLE SAMPLER. OCT. 21, 1969. CAN. 0852475, GRB. 1194569.

3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. CAN. 0888335.

3,940,997.—APPARATUS AND METHOD FOR MEASURING ANGLE OF REPOSE. MAR. 2, 1976.

Class 22B

3,938,993.—XEROGRAPHIC METHOD FOR MAKING A RESPONSIVE ANSWER SYSTEM. FEB. 17, 1976. CAN. 0858780, GRB. 1235941, JAP. 0688426.

3,972,715.—PARTICLE ORIENTATION IMAGING SYSTEM. AUG. 3, 1976.

Class 22B 1

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.

3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.

3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1A

3,477,821.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169582, AUS. 0433117, BEL. 0725955, CAN. 0876261, FRA. 1596338, GER. 1816225, GRB. 1245780, HOL. 0141402, ITL. 0852626, JAP. 0805178, MEX. 0108467. PNM. 0001764, SPN. 0361841, STZ. 0531895, SWD. 0345742, VZL. 0023719.

3,477,822.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169541, AUS. 0433116, BEL. 0725958, CAN. 0904725, FRA. 1596340, GRB. 1251680, HOL. 0141098, ITL. 0852625, JAP. 0802751, MEX. 0108998, PNM. 0001662, SPN. 0361844, STZ. 0530223, SWD. 0346384, VZL. 0023725.

3,480,398.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169487, AUS. 0433114, BEL. 0725956, CAN. 0885006, FRA. 1596337, GER. 1816228, GRB. 1257336, HOL. 0141797, ITL. 0856875, JAP. 0805177, MEX. 0108468, PNM. 0001663, SPN. 0361842, STZ. 0530637, SWD. 0345012, VZL. 0023722.

3,480,399.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169540, AUS. 0433115, BEL. 0725957, CAN. 0906891, FRA. 1596339, GER. 1816227, GRB. 1251679, HOL. 0141099, ITL. 0852624, JAP. 0802750. MEX. 0108997, PNM. 0001669, SPN. 0361843, STZ. 0526106, VZL. 0023720.

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,545,934.—CHEMICAL PACKAGE. DEC. 8, 1970. BEL. 0739751, CAN. 0887759. FRA. 6933737, GER. 1950067, GRB. 1257337, HOL. 150690, ITL. 0873750.

3,545,935.—DISPOSABLE REACTION CONTAINER FOR AN AUTOMATIC CHEMICAL ANALYZER. DEC. 8, 1970. ARG. 0179456, AUS. 0447958, BEL. 0741890, CAN. 0933494, FRA. 6939709, GER. 1957735, GRB. 1257338, HOL. 0145773, ITL. 0878322, MEX. 0113681, SPN. 0373794, STZ. 0500010, SWD. 0353399.

3,554,705.—CHEMICAL PACKAGE. JAN. 12, 1971.

3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

3,582,285.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1B

3,497,320.—AUTOMATED CHEMICAL ANALYZER FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.

3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.

3,586,446.—FLAME PHOTOMETER. JUNE 22, 1971. ARG. 0183956, BEL. 0720577, CAN. 0876239, FRA. 1581844, GER. 1798234, GRB. 1246633, ITL. 0864506, JAP. 0835088, MEX. 0103300, SWD. 0342326, VZL. 0023659.

Class 22B 2

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336. ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,520,659.—METHOD AND APPARATUS FOR USE IN DETERMINING PROTHROMBIN TIME OF A BLOOD SAMPLE. JULY 14, 1970. ARG. 0176972, AUS. 0421560, BEL. 0722360, CAN. 0892696, FRA. 1588701, GER. 1804292, GRB. 1244355, HOL. 0142783, ITL. 0862597, MEX. 0105611, SPN. 0359312, SWD. 0345744, VZL. 0023706.

3,705,013.—ANALYTICAL PROCEDURES AND COMPOSITIONS THEREFOR. DEC. 5, 1972.

Class 24

3,888,892.—LIQUID CRYSTALLINE COMPOUNDS. JUNE 10, 1975.

Class 24A 1

3,289,211.—ELECTRICAL RECORDING PEN. NOV. 29, 1966. ARG. 0144972, AUS. 0283737, BEL. 0663614, CAN. 0755964. FRA. 1444045, GER. 1498264, GRB. 1064344, HOL. 0145955, ITL. 0760432, JAP. 0704598, MEX. 0084384, NOR. 0121120, NZL. 0141445, SPN. 0312594, STZ. 0430241, SWD. 0336857, VZL. 0017268.

3,308,475.—ELECTROVISCOUSLY CONTROLLED RECORDER. MAR. 7, 1967.

3,359,566.—MOTOR ACTION CAPILLARY. DEC. 19, 1967. CAN. 0831673, GER. 1537562, GRB. 1196932, JAP. 0583415.

3,375,528.—RECORDING PEN HAVING A PLURALITY OF CLOSELY SPACED WIRES. MAR. 26, 1968. AUS. 0284067, BEL. 0680693, CAN. 0834975, FRA. 0089948, GER. 1548876, GRB. 1148771, HOL. 0150907, ITL. 0809504, JAP. 0773176, MEX. 0091261, SPN. 0326324, STZ. 0457888, SWD. 0325719.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,512,173.—ALPHANUMERIC INK DROPLET RECORDER. MAY 12, 1970. ARG. 0180676, BEL. 0725960, CAN. 0879917, FRA. 1603645, GER. 1816194, GRB. 1227600, ITL. 0849703, JAP. 0770832, MEX. 0109982.

3,512,177.—INK RECORDING SYSTEM. MAY 12, 1970.

3,848,258.—MULTI-JET INK PRINTER. NOV. 12, 1974. BEL. 0819105, CAN. 1000778, FRA. 7419592.

3,893,131.—INK PRINTER. JULY 1, 1975. BEL. 0819105, CAN. 1000778, FRA. 7419592.

4,014,693.—ELECTROVISCOUS RECORDING. MAR. 29, 1977.

Class 24A 2

3,329,964.—FACSIMILE RECORDING APPARATUS. JULY 4, 1967. CAN. 0809338, GRB. 1095098.

3,334,354.—DOTTING INK RECORDER. AUG. 1, 1967. CAN. 0792422.

3,627,908.—HIGH-SPEED COLOR CORRECTING SCANNER FOR MAKING COLOR PRINTING PLATES. DEC. 14, 1971. CAN. 0923428, GRB. 1335980, JAP. 0774708.

4,024,544.—MENISCUS DAMPENING DROP GENERATOR. MAY 17, 1977.

4,032,929.—HIGH DENSITY LINEAR ARRAY INK JET ASSSEMBLY. JUNE 28, 1977.

4,057,807.—SEPARABLE LIQUID DROPLET INSTRUMENT AND MAGNETIC DRIVER THEREFOR. NOV. 8, 1977.

Class 24A 3

3,287,734.—MAGNETIC INK RECORDING. NOV. 22, 1966. CAN. 0808834, FRA. 1490442, GRB. 1102505, HOL. 0150643, ITL. 0784569, JAP. 0571140.

3,334,000.—METHOD FOR SIMULTANEOUS PRODUCTION OF A PLURALITY OF MICROCIRCUIT WAFERS. AUG. 1, 1967.

Class 24A 4

3,480,962.—FACSIMILE RECORDING SYS. NOV. 25, 1969.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,484,793.—IMAGE RECORDING APPARATUS INK DROPLET RECORDER WITH OPTICAL INPUT. DEC. 16, 1969.

3,553,708.—APPARATUS AND METHOD EMPLOYING PHOTOELECTROVISCOUS INK. JAN. 5, 1971.

Class 24B

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

4,080,054.—DEVICE FOR REPLENISHING TONER PARTICLES. MAR. 21, 1978.

4,096,294.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND CRYST. JUNE 20, 1978.

Class 24B 1

3,833,293.—METHOD OF CREATING COLOR TRANSPARENCIES. SEPT. 3, 1974.

4,047,947.—PROCESS FOR THE PREPARATION OF TRANSPARENCIES BY SELECTIVE DECOMPOSITION OF AN ORGANOSELENI. SEPT. 13, 1978.

4,055,424.—NOVEL MICROFILM AND PROCESS FOR PREPARATION. OCT. 25, 1977.

Class 24B 1A

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

Class 24B 1B 1

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458. ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

Class 24B 1B 2

2,940,358.—IMAGE REVERSING OPTICAL SYSTEM. JUNE 14, 1960.

Class 24B 1B 3

3,459,888.—SELECTIVE PHOTOCOPIER. AUG. 5, 1969.

3,537,788.—AUTOMATIC DISCRIMINATION TECHNIQUE FOR SELECTIVE PHOTOCOPYING. NOV. 3, 1970.

Class 24B 1C

2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.

3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

3,480,965.—APPARATUS FOR PYROGENICALLY RECORDING ON TRANSPARENCIES. NOV. 25, 1969.

Class 24B 1D

2,752,443.—SIGNALING DEVICE FOR PHOTOCOPY MACHINE. JUNE 26, 1956.

3,435,243.—FILM FRAME DETECTION SYSTEM. MAR. 25, 1969.

Class 24B 2A

3,349,980.—VACUUM TRANSPORT DEVICE. OCT. 31, 1967.

3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.

Class 24B 2B

3,409,364.—GATE ASSEMBLY. NOV. 5, 1968.

3,409,365.—CONTACT PRINTER. NOV. 5, 1968. AUS. 0425973, JAP. 0613746.

Class 24B 2C

3,379,110.—EXPOSURE CONTROL SYSTEM. APR. 23, 1968.

3,479,119.—EXPOSURE CONTROL APPARATUS. NOV. 18, 1969.

Class 24B 2D 1

2,740,716.—PHOTOGRAPHIC STRIPPING TISSUE. APR. 3, 1956.

Class 24B 3A

2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.

Class 24B 3B

2,913,973.—PHOTOGRAPHIC MATERIAL CONVEYING APPARATUS. NOV. 24, 1959.

2,913,974.—PHOTOGRAPHIC MATERIAL PROCESSING. NOV. 24, 1959.

Class 24B 4

3,510,216.—PROJECTION APPARATUS. MAY 5, 1970.

Class 24C

4,007,682.—REVERSE ANGLE MOUNTED INK-SPLITTING DOCTOR BLADE. FEB. 15, 1977.

Class 24C 1

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

Class 24C 1A

3,170,395.—DUPLICATING. FEB. 23, 1965. AUS. 0410880, CAN. 0768079, FRA. 1414985, GRB. 1059659, ITL. 0740682, JAP. 0511405.
3,332,347.—DUPLICATING. JULY 25, 1967. AUS. 0271226, CAN. 0761868, FRA. 1367474, GER. 1471696, GRB. 1029997, ITL. 0730203.
3,357,353.—VAPOR THERMOGRAPHY RECORDING PROCESS AND RECORDING MEMBER USED THEREIN. DEC. 12, 1967.

Class 24C 1B

3,336,867.—DUPLICATING PROCESS. AUG. 22, 1967. CAN. 0796971, GRB. 1149056.

Class 24C 1C

3,487,775.—IMAGING SYSTEM. JAN. 6, 1970. CAN. 0873983.

Class 24C 1D

3,408,216.—IMAGE REPRODUCTION. OCT. 29, 1968. CAN. 0806942, GRB. 1127218, JAP. 0742511.
3,792,266.—THERMOGRAPHIC RECORDING USING VAPORIZED MATERIAL AND COLORED PARTICLE DEVELOPMENT. FEB. 12, 1974.

Class 24C 1E 1

3,402,660.—DRUM SUPPORT AND DRIVE SYSTEM FOR REPRODUCTION MACHINES. SEPT. 24, 1968.
3,427,965.—SHEET GRIPPER MEANS FOR REPRODUCTION MACHINE OF THE PRESSURE TRANSFER TYPE. FEB. 18, 1969.
3,429,259.—PRESSURE TRANSFER REPRODUCTION MACHINE. FEB. 25, 1969.
3,460,472.—TRANSFER SHEET CLAMPING MECHANISM FOR A REPRODUCTION MACHINE. AUG. 12, 1969.

Class 24C 1E 2

3,433,154.—PRESSURE PRODUCING MEANS FOR REPRODUCTION MACHINE. MAR. 18, 1969.

Class 24C 1E 3

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,380,379.—SHEET GUIDING MECHANISM FOR A REPRODUCTION MACHINE. APR. 30, 1968.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,427,966.—PRESSURE TRANSFER TYPE REPRODUCTION MACHINE. FEB. 18, 1969.
3,430,558.—SHEET COUNTING SYSTEM IN A REPRODUCTION MACHINE. MAR. 4, 1969.

Class 24C 1E 4

3,375,779.—PROGRAMMING CONTROL FOR REPRODUCTION MACHINES. APR. 2, 1968.

Class 24C 1E 5

2,949,849.—STENCIL MASTER MAKING. AUG. 23, 1960.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.
3,093,068.—METHOD AND APPARATUS FOR PATTERN REPRODUCTION. JUNE 11, 1963. CAN. 0624373.
3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,681,065.—DYE TRANSFER COLOR PHOTOGRAPHY. AUG. 1, 1972.

Class 24C 1E 6

3,527,163.—SILK SCREEN MASTER. SEPT. 8, 1970.

Class 24C 1E 7

3,357,354.—REPRODUCTION METHOD. DEC. 12, 1967.
3,406,137.—IMAGING MATERIAL. OCT. 15, 1968. AUS. 0409415, BEL. 0680375, CAN. 0815085, FRA. 1477912, GER. 1571874, GRB. 1149055, ITL. 0766799, JAP. 0594685, MEX. 0090845, SWD. 0336860.
3,415,186.—DUPLICATING SYSTEM. DEC. 10, 1968.
3,436,234.—DUPLICATING INK. APR. 1, 1969. AUS. 0408998, BEL. 0680377, CAN. 0806568, FRA. 1477914, GER. 1571875, GRB. 1151495, ITL. 0765635, JAP. 0594687, MEX. 0090362, SWD. 0336421.
3,446,646.—PRESSURE SENSITIVE RECEIVING AND TRANSFER SHEET. MAY 27, 1969. AUS. 0417562, BEL. 0680376, CAN. 0865673, FRA. 1477913, GER. 1571922, GRB. 0115076, ITL. 0765634, JAP. 0575982, MEX. 0090589, SWD. 0333578.

Class 24D

2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINGING PLATE. SEPT. 13, 1960.
2,988,988.—METHOD OF ETCHING AND DAMPENING PLANOGRAPHIC PRINTING PLATES AND FOUNTAIN SOLUTION THEREFOR. JUNE 20, 1961.
3,001,872.—PREPARING PLANOGRAPHIC PLATES AND SOLUTION THEREFOR. SEPT. 26, 1961. CAN. 0610997, GRB. 0879990.
3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,422,759.—LITHOGRAPHIC IMAGING SYSTEM USING PHOTOCHROMIC AND THERMOCHROMIC MATERIALS. JAN. 21, 1969. CAN. 0855648, GRB. 1190102.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794. VZL. 0024009.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,718,087.—APPARATUS FOR APPLYING INK AND IMMISSIBLE FLUID TO A PRINTING SURFACE. FEB. 27, 1973. ARG. 0185945, AUS. 0449639, BEL. 0759110, CAN. 0919007, FRA. 7042608, GRB. 1330183, ITL. 0912865, MEX. 0120782.
3,878,168.—SILICONE ELASTOMERS. APR. 15, 1975.
3,901,151.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. AUG. 26, 1975.
3,907,562.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. SEPT. 23, 1975.
3,909,256.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING SCREEN PRINTING MEMBER. SEPT. 30, 1975.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.
3,948,655.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING GRAVURE PRINTING MEMBER. APR. 5, 1976.
3,951,060.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,951,063.—PROCESS FOR PREPARING REVERSIBLE CURE WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,957,349.—IMAGING METHOD. MAY 18, 1976.
3,961,947.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. JUNE 8, 1976.
3,968,278.—IMAGING METHOD. JULY 6, 1976.
3,971,316.—PROCESS FOR SMOOTHING WATERLESS LITHOGRAPHIC MASTERS. JULY 27, 1976.
3,995,554.—PROCESS FOR PREPARING RESILIENT IMAGED PRINTINGS MASTERS. DEC. 7, 1976.
3,999,481.—METHOD OF MAKING A MASTER. DEC. 28, 1976.
4,003,312.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC PRINTING MASTERS BY INK JET PRINTING MEANS. JAN. 18, 1977.
4,005,654.—PROCESS FOR SHALLOW RELIEF PRINTING. FEB. 1, 1977. BEL. 0792620, FRA. 7244602, GRB. 1416158, ITL. 0971749.

4,007,041.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.
4,009,032.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND THERMOPLA. FEB. 22, 1977.
4,009,660.—INKING IN LITHO PRINTING THROUGH A NON-IMAGED SCREEN. MAR. 1, 1977.
4,010,687.—PLANOGRAPHIC PRINTING MASTER-MULTI PHASE TONERS & MULTI PHASE ADHESIVE LAYERS. MAR. 8, 1977. BEL. 0813293, CAN. 0988364, GRB. 1458725, ITL. 1006438, PTG. 61726.
4,012,254.—NOVEL PHOTOCONDUCTIVE WATERLESS LITHOGRAPHIC PRINTING MASTERS & PROCESS OF PREPARATION. MAR. 15, 1977.
4,016,814.—PLANOGRAPHIC PRINTING MASTER — SPONGY IMAGE PATTERNS. APR. 12, 1977. CAN. 0985952, ITL. 1006441.
4,019,437.—PLANOGRAPHIC PRINTING MASTER TONER INDUCED POROUS SPONGE IMAGES TIPSI. APR. 26, 1977. BEL. 0813159, CAN. 1014416, GRB. 1458723, ITL. 1006440, NZL. 0173942.
4,030,416.—WATERLESS PRINTING MASTER. JUNE 21, 1977.
4,064,312.—NONIMAGED WATERLESS LITHOGRAPHIC MASTER WITH CURABLE SILICONE ELASTOMER AND A CURED INK REL. DEC. 20, 1977.
4,077,324.—METHOD OF FOUNTAINLESS LITHOGRAPHY. MAR. 7, 1978. FRA. 7520962.
4,077,325.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS. MAR. 7, 1978.
4,078,927.—PHOTOCONDUCTIVE PRINTING MASTER. MAR. 14, 1978.
4,080,897.—SELECTIVE TACK IMAGING AND PRINTING. MAR. 28, 1978.
4,081,572.—PREPARATION OF HYDROPHILIC LITHOGRAPHIC PRINTING MASTERS. MAR. 28, 1978.
4,077,073.—PROCESS FOR PREPARING INK RELEASING STENCIL. MAY 9, 1978.
4,097,138.—PHOTOCONDUCTIVE BELT INCREMENTING APPARATUS. JUNE 27, 1978.
4,100,135.—NOVEL ELASTOMERS AND IMPROVED WATERLESS LITHOGRAPHIC PRINTING MASTERS. JULY 11, 1978.

Class 24E

3,315,602.—FORMING OF PRINTING PLATES. APR. 25, 1967. CAN. 0852683, GER. 1267227, GRB. 1132071, JAP. 0532965.
3,443,517.—ELECTROSTATIC DUPLICATION SYSTEM EMPLOYING RELIEF PRINTING PLATE. MAY 13, 1969. CAN. 0873982, GRB. 1212370, JAP. 0641477.
3,456,586.—PROCESS FOR MAKING AND USING A RELIEF PRINTING MASTER. JULY 22, 1969.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,957,348.—METHOD FOR ALTERING ELLIPTICALLY POLARIZED LIGHT. MAY 18, 1976.
3,964,907.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. JUNE 22, 1976.
4,017,581.—PROCESS FOR PREPARING PRINTING MASTERS & MOLDS. APR. 12, 1977.

Class 24F

3,445,226.—FROST GRAVURE PRINT MASTER. MAY 20, 1969. CAN. 0842443, FRA. 1480896, GRB. 1136029, ITL. 0771305, JAP. 0605647, MEX. 0093298.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,561,358.—GRAVURE IMAGING SYSTEM. FEB. 9, 1971. CAN. 0908257, GRB. 1201819, JAP. 0594737.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,801,315.—GRAVURE IMAGING SYSTEM. APR. 2, 1974. CAN. 0991245, GRB. 1411237.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 24G

3,565,978.—REPLICATION OF SURFACE DEFORMATION IMAGES. FEB. 23, 1971. AUS. 0417038, BEL. 0710829, CAN. 0879916, FRA. 1583418, GER. 1621783, GRB. 1221342, ITL. 0863054, MEX. 0096672.
3,592,114.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. JULY 13, 1971.
3,678,850.—POROUS PRINTING PLATE PREPARED FROM PARTICULATE PHOTOSENSITIVE RESINOUS MATERIAL. JULY 25, 1972. CAN. 0844327, GRB. 1188376, JAP. 0635879.
4,059,554.—STABILIZE EMULSION INKS. NOV. 22, 1977.
4,068,588.—PRINTING USING AN ELECTROCHROMIC IMAGE. JAN. 17, 1978.
4,093,371.—COMPOSING MACHINE. JUNE 6, 1978.

Class 25

3,692,659.—ELECTROLYTIC REVERSIBLE COLOR DISPLAY DEVICE. SEPT. 19, 1972. CAN. 0932427, GRB. 1356187.
4,056,822.—LOW PROFILE SINGLE CHANNEL THERMAL ANALOG RECORDER. NOV. 1, 1977.
4,056,823.—ANALOG CHART RECORDER EMPLOYING THERMAL PRINTING MEANS. NOV. 1, 1977.
4,099,071.—MONOLITHIC ELECTRONIC SCANNING DEVICE. JULY 4, 1978.

Class 25A

3,692,404.—STRIPPABLE LAYER RELIEF PRINTING. SEPT. 19, 1972.
3,900,817.—SPHERICAL POTENTIOMETER WITH BALL CONTACT MEANS. AUG. 19, 1975.
3,990,072.—ACOUSTIC RESIDUE ALGEBRA DECORDER. NOV. 2, 1976.

Class 25A 1

3,061,911.—METHOD OF MAKING PRINTED CIRCUITS. NOV. 6, 1962.
3,075,866.—METHOD OF MAKING PRINTED CIRCUITS. JAN. 29, 1963.
3,207,127.—APPARATUS FOR FORMING COATINGS ON PRINTED CIRCUIT BOARDS. SEPT. 21, 1965. CAN. 0733463, FRA. 1374360, GER. 1490985, GRB. 1053284, ITL. 0696974.
3,217,209.—PRINTED CIRCUITS WITH RESISTIVE AND CAPACITIVE ELEMENTS. NOV. 9, 1965. CAN. 0782178, FRA. 1300771, GER. 1202853, GRB. 0978571, ITL. 0647493, JAP. 0430795.
3,219,509.—AN APPARATUS FOR AUTOMATIC FABRICATION OF MICROCIRCUITRY. NOV. 23, 1965. CAN. 0785448, GRB. 1031288, JAP. 0477810.
3,288,639.—METHOD FOR MAKING A PLURAL LAYERED PRINTED CIRCUIT BOARD. NOV. 29, 1966.
3,485,934.—CIRCUIT BOARD. DEC. 23, 1969.
3,893,409.—APPARATUS FOR SOLDER COATING PRINTED CIRCUIT. JULY 8, 1975.
3,990,024.—MICROSTRIP STRIPLINE IMPEDANCE TRANSFORMER. NOV. 2, 1976.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.
4,024,631.—PRINTED CIRCUIT BOARD PLATING PROCESS. MAY 24, 1977.
4,029,373.—MEANS FOR WIRING INTO A SEALED ENCLOSURE. JUNE 14, 1977. CAN. 0995367, GRB. 1444032.
3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
4,046,105.—LAMINAR DEEP WAVE GENERATOR. SEPT. 6, 1977.
4,048,718.—PIN CRIMPING APPARATUS AND PRODUCT THEREFROM. SEPT. 20, 1977.
4,083,323.—PNEUMATIC SYSTEM FOR SOLDER LEVELING APPARATUS. APR. 11, 1978.

Class 25A 2

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
3,164,750.—ELECTRONIC PACKAGING APPARATUS. JAN. 5, 1965.
3,445,926.—PRODUCTION OF SEMICONDUCTOR DEVICES BY USE OF ION BEAM IMPLANTATION. MAY 27, 1969.
3,906,537.—SOLID STE ELMNT CMPRSNG SMI-CNDCTVE GLS CMPSTN EXHBING NGTVE INCRMNTL RSISTNCE AND TRSHLD SWTCHNG. SEPT. 16, 1975. BEL. 0820772, CAN. 1005929.
3,956,042.—SELECTIVE ETCHANTS FOR THIN FILM DEVICES. MAY 11, 1976.

Class 25A 3

3,244,556.—ABRASION FOR THIN FILM RESISTANCE CONTROL. APR. 5, 1966. CAN. 0788954, FRA. 1385420, GER. 1490986, GRB. 1054076, ITL. 0705899, JAP. 0453904.
3,274,372.—SOLID VAPORIZATION. SEPT. 20, 1966.
3,287,161.—METHOD FOR FORMING A THIN FILM RESISTOR. NOV. 22, 1966. CAN. 0819895, ITL. 0705900, JAP. 0499787.
3,352,731.—THIN FILM PRINTED CIRCUIT. NOV. 14, 1967. AUS. 0296168, CAN. 0790796, FRA. 1419084, GER. 1490987, GRB. 1077686, ITL. 0739442, JAP. 0537661.
3,413,716.—THIN FILM INDUCTOR ELEMENTS. DEC. 3, 1968. CAN. 0841245, FRA. 1476476, GRB. 1149759.
3,832,766.—APPARATUS FOR ASSEMBLING A PLATED WIRE MEMORY PLANE. SEPT. 3, 1974. CAN. 0942420, GRB. 1376654.

Class 25A 4

3,317,656.—ELECTRICAL CONNECTION FOR SHEATHED CONDUCTORS. MAY 2, 1967.
3,603,357.—BACKWIRING. SEPT. 7, 1971.
3,644,659.—CABLE CONSTRUCTION. FEB. 22, 1972.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,847,479.—COVER FOR WIRE WRAPPED CARD CHASSIS. NOV. 12, 1974.
3,861,775.—MULTIPLE CIRCUIT BOARD CONNECTOR. JAN. 21, 1975. GRB. 1419580.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,937.—BACK WIRING. SEPT. 9, 1975.
4,045,750.—ELECTRICAL CABLE AND COUPLING ARRANGEMENT. AUG. 30, 1977. FRA. 7631197.

Class 25B

3,688,127.—DIGITAL CIRCUIT LOGIC. AUG. 29, 1972.
3,937,986.—LINEAR WAVEFORM GENERATOR. FEB. 10, 1976.
3,975,755.—STABLE NON-CRYSTALLINE MATERIAL FOR SWITCHING DEVICES. AUG. 17, 1976.
4,095,020.—PROCESS FOR CONTROLLED PHASE TRANSFORMATION OF ALPHA PHASE OF POLY (VINYLIDENE FLUORIDE) TO. JUNE 13, 1978.

Class 25B 1

3,384,792.—STACKED ELECTRODE FIELD EFFECT TRIODE. MAY 21, 1968.
3,584,268.—INVERTED SPACE CHARGE LIMITED TRIODE. JUNE 8, 1971.
3,599,321.—INVERTED SPACE CHARGE LIMITED TRIODE. AUG. 17, 1971.

Class 25B 2

3,510,735.—HIGH SPEED SEMICONDUCTOR. MAY 5, 1970.
3,673,572.—ELECTROLUMINESCENT DEVICE. JUNE 27, 1972. CAN. 0919286.
3,697,163.—PLUG-IN VACUUM AND CIRCUIT SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. OCT. 10, 1972. CAN. 0941883.

Class 25B 3

3,551,727.—THERMIONIC CONVERTER HAVING A LOW FUNCTION COLLECTOR ELECTRODE. DEC. 29, 1970.
3,928,812.—PROGRAMMABLE BIT CLOCK OSCILLATOR FOR CONTROLLING THE PROCESSING OF BINARY DIGITS. DEC. 23, 1975. CAN. 0997434.

Class 25B 4

3,579,031.—ZERO ARC DROP THYRATRON. MAY 18, 1971.

Class 25C

3,911,420.—DISPLAY SYSTEM INCLUDING A HIGH-RESOLUTION CHARACTER GENERATOR. OCT. 7, 1975.
3,937,937.—PRIMARY POWER FAULT DETECTOR. FEB. 10, 1976. CAN. 1011818.
4,045,750.—ELECTRICAL CABLE AND COUPLING ARRANGEMENT. AUG. 30, 1977. FRA. 7631197.

Class 25C 1

3,296,483.—WIDEBND AMPLER UTLZNG COMN ELCTRN BEAM FR INTRACTN W/HIFRQCY TRVLGWAVE LINE AND W/LOWFRQCY ELCTRN M. JAN. 3, 1967.
3,299,367.—FEEDBACK AMPLIFIER. JAN. 17, 1967.
3,404,341.—ELECTROMETER UTILIZING A DUAL PURPOSE FIELD-EFFECT TRANSISTOR. OCT. 1, 1968.
3,457,520.—FIELD EFFECT TRANSISTOR BUFFER AMPLIFIER. JULY 22, 1969. CAN. 0830628, FRA. 1541017, GER. 1562109, GRB. 1189515, ITL. 0806188, JAP. 0573712.
3,525,948.—SEISMIC AMPLIFIERS. AUG. 25, 1970.
3,594,654.—DIRECT COUPLED DIFFERENTIAL AMPLIFIER. JULY 20, 1971.
3,790,288.—PHOTOMETER INCLUDING VARIABLE AMPLIFICATION AND DARK CURRENT COMPENSATION. FEB. 5, 1974.

Class 25C 2

2,475,722.—WEB FEED CONTROL. JULY 12, 1949.
3,316,495.—LOW LEVEL COMMUTATOR. APR. 25, 1967.
3,426,259.—ELECTRIC CONTROL CIRCUITS FOR SEQUENTIAL OPERATION OF MOTIVE MEANS. FEB. 4, 1969.
3,454,884.—DUTY CYCLE CONTROL CIRCUIT. JULY 8, 1969. CAN. 0859886, GRB. 1195983, JAP. 0576017.
3,612,907.—SELF-CHECKING FLIP-FLOP. OCT. 12, 1971.
3,668,414.—TRANSITION INTEGRATION SWITCHING AMPLIFIER. JUNE 6, 1972. ARG. 0183473, AUS. 0460647, BEL. 0765005, CAN. 0930432, FRA. 7111626, GRB. 1334407, ITL. 0921529, MEX. 0119755, USR. 0420197, VZL. 0027511.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,806,242.—APPARATUS FOR REGULATING OPERATION OF DEV IN ACCORDANCE W SUPPLY OF MATERIAL UPON WHICH DEV OPER. APR. 23, 1974. CAN. 1004288, GRB. 1387190.
3,828,222.—FLASH LAMP CIRCUIT. AUG. 6, 1974.
3,856,997.—INDICATING AND SWITCHING APPARATUS. DEC. 24, 1974. BEL. 0809124, CAN. 1004261, ITL. 1002375, MEX. 0135820, SPN. 0421710.
3,866,051.—DIGITAL INTERFACE MODULE. FEB. 11, 1975. BEL. 0810490, GBR. 1455213.
3,932,770.—CONTROL CIRCUIT FOR SWITCHING TRIACS. JAN. 13, 1976.

Class 25C 3

3,311,810.—STATIC FREQUENCY MULTIPLIER UTILIZING A PLURALITY OF SATURABLE MAGNETIC CORES. MAR. 28, 1967.
3,340,416.—RADIATION GENERATOR HVNG A CONDCTV COATNG ON A PIEZO-ELCTRC DIFFRCTN GRATING FOR VARYNG OTPT FR. SEPT. 5, 1967.
3,373,377.—SELF-ADJUSTING VARIABLE FREQUENCY SAWTOOTH GENERATOR. MAR. 12, 1968.
3,543,080.—CRT PINCUSHION DISTORTION CORRECTION APPARATUS. NOV. 24, 1970.
3,659,207.—MULTI-WAVE FORM GENERATION FROM A SINGLE TAPPED DELAY LINE. APR. 25, 1972.
4,048,571.—FREQUENCY DOUBLER. SEPT. 13, 1977.

Class 25C 4

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3416,861-D1593. AUG. 7, 1973.
3,280,309.—LOGARITHMIC PULSE COUNTER. OCT. 18, 1966.
3,416,861.—SIGNAL STORAGE DEVICE—REISSUED D72104-27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,422,287.—PULSE STRETCHING CIRCUIT FOR GENERATING PULSES OF MINIMUM WIDTH. JAN. 14, 1969. AUS. 0408950, CAN. 0814593, GRB. 1087749, ITL. 0773401, SWD. 0337041.
3,593,043.—PULSE SHAPING CIRCUIT. JULY 13, 1971.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,757,032.—METHOD AND APPARATUS FOR SELECTIVELY ENABLING A REMOTE RECEIVER. SEPT. 4, 1973.
3,781,548.—CONTROL SYSTEM. DEC. 25, 1973.
3,816,727.—ECHO CHECK CIRCUIT. JUNE 11, 1974. CAN. 0999463, FRA. 7341866, GRB. 1422835.
3,839,665.—APP MEASRNG RELTV VELCTY MOVBL MEMBR INCLDNG MEANS TO DETECT VELCTY FROM POSITION ENCODER. OCT. 1, 1974. CAN. 0980409, GRB. 1290090, JAP. 0832378.

3,863,143.—APP FOR RECORDING THE OCCURRENCE OF A PREDETERMINED OPERATION BY SENSING MAGNETIC FIELD OPERATION. JAN. 28, 1975.
3,875,387.—MAGNETIC OPERATIONS MONITOR. APR. 1, 1975.
3,931,580.—DIGITAL LINE RECEIVER CIRCUIT. JAN. 6, 1976.
3,953,708.—THERMAL PRINTER USING AMORPHOUS SEMICONDUCTOR DEVICES. APR. 27, 1976.
3,971,919.—PROGRAMMABLE BILLING SYSTEM. JULY 27, 1976. BEL. 0812673, FRA. 7409746, GRB. 1451993, ITL. 1007663, SPN. 0424543.
3,983,315.—ELECTROMAGENTIC COUNTER CIRCUIT. SEPT. 28, 1976.
3,987,311.—SHIFT REGISTER UTILIZING AMORPHOUS SEMICONDUCTOR THRESHOLD SWITCHE. OCT. 19, 1976.
3,989,930.—MULTI-MODE BILLING SYSTEM CONTROLLED BY COPY SIZE AND DOCUMENT ORIGINAL SIZE. NOV. 2, 1976.

Class 25C 5

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,496,385.—HIGH VOLTAGE COMPENSATED TRANSISTORIZED SWITCHING APPARATUS. FEB. 17, 1970. CAN. 0853862, FRA. 1521443, GRB. 1181718, ITL. 0793728, JAP. 0592682.
3,522,509.—FLOATING POWER SUPPLY. AUG. 4, 1970.
3,809,916.—DUAL CORD INTERLOCK. MAY 7, 1974. CAN. 1004283, GRB. 1423758.
3,870,903.—PHASE CONTROLLED POWER SUPPLY. MAR. 11, 1975.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,004,209.—WIDE RANGE POWER CONVERSION SYSTEM. JAN. 18, 1977.

Class 25C 6

3,192,519.—DIGITAL TRANSIENT ANALYZER. JUNE 29, 1965.
3,376,490.—SYNTHESIZED WAVE STATIC INVERTERS. APR. 2, 1968.
3,508,080.—BRIDGE GATING NETWORK HAVING POWER GAIN. APR. 21, 1970.
3,555,540.—DIGITAL TO ANALOG CONVERTER WITH SMOOTHED RECOVERY. JAN. 12, 1971.
3,599,037.—GAS LAMP LEAD BALLAST CIRCUIT HAVING FEED CONTROL. AUG. 10, 1971. ARG. 0182960, BEL. 0749784, CAN. 0907126, FRA. 7015813, GRB. 1308525, ITL. 0900023, MEX. 0116550.
3,638,089.—SPEED CONTROL SYSTEM HAVING HIGH AND LOW LEVEL SPEED MEANS. JAN. 25, 1972. GRB. 1322611.
3,670,269.—AUTOMATIC TRANSVERSAL EQUALIZER. JUNE 13, 1972. CAN. 0932412, GRB. 1353018.
3,689,915.—ENCODING SYSTEM. SEPT. 5, 1972. CAN. 0870252, GER. 1562051, GRB. 1207701, JAP. 0675600.
3,691,542.—MAGNETIC MEMORY DISK DRIVE APPARATUS WITH REDUCED R.F. NOISE. SEPT. 12, 1972. GRB. 1328717, JAP. 0840914.
3,699,555.—APPARATUS FOR RAPID ACTION DISPLACEMENT CONTROL. OCT. 17, 1972. CAN. 985413, GRB. 1366124.
3,737,569.—TRANSMISSION DEVICE. JUNE 5, 1973.
3,742,374.—TRANSDUCER DEVICE. JUNE 26, 1973.
3,761,799.—CURRENT STABILIZING CIRCUIT HAVING MINIMAL LEAKAGE CURRENT EFFECTS. SEPT. 25, 1973. BEL. 0792285. FRA. 7243406, GRB. 1395600, ITL. 0971515, MEX. 131737.
3,778,817.—OUTPUT KEYBOARD APPARATUS AND SIGNAL TRANSLATING METHODS THEREFOR. DEC. 11, 1973.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,818,297.—MOTOR CONTROL APPARATUS. JUNE 18, 1974. CAN 1004296, GRB. 1454269.
3,832,065.—DRUM TRACK DETECTOR. AUG. 27, 1974. GRB. 1458283.
3,880,516.—DIAGNOSTIC CIRCUIT BOARD. APR. 29, 1975. BEL. 0808231, FRA. 7342590, GRB. 1447394, ITL. 1002163, SPN. 421149.
3,904,922.—LAMP CONTROL AND LAMP SWITCH CIRCUIT. SEPT. 9, 1975.
3,906,194.—SIGNAL PROCESSOR. SEPT. 16, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,918,046.—DIGITAL TO ANALOG CONVERTER. NOV. 4, 1975. ARG. 0197211, BEL. 0795801, FRA. 7305890, GRB. 1417772, ITL. 0979289, MEX. 131264, SPN. 0411883, STZ. 0564887.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,928,772.—TIME DEPENDENT FAULT DETECTOR. DEC. 23, 1975. BEL. 0826690.
3,989,371.—CYCLE-OUT LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 2, 1976.
3,991,355.—STEPPER MOTOR CONTROL. NOV. 9, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,074,147.—SWITCHING AMPLIFIERS. FEB. 14, 1978.
4,101,788.—MOS BUFFER CIRCUIT. JULY 18, 1978.
4,103,252.—CAPACITIVE TOUCH-ACTIVATED TRANSDUCER SYSTEM INCLUDING A PLURALITY OF OSCILLATORS. JULY 25, 1978.

Class 26

D.225,572.—BOOK STACKING UNIT FOR XEROGRAPHIC REPRODUCTION MACHINE. DEC. 19, 1972.
D.231,127.—COPYING MACHINE-LARGE DOCUMENT COPYING FRAME-DECOY. APR. 2, 1974.
D.231,128.—COPYING MACHINE. APR. 2, 1974.
D.231,129.—COPYING MACHINE. APR. 2, 1974.
D.231,564.—COPYING MACHINE. APR. 30, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
D.236,446.—CART. AUG. 26, 1975.
D.236,491.—COMPUTER CABINET. AUG. 26, 1975.
D.236,897.—COMPUTER CABINET. SEPT. 23, 1975.
D.236,961.—BALANCE SCALE. SEPT. 30, 1975.
D.238,450.—PAPER CASSETTE. JAN. 13, 1976.
D.238,966.—COPIER EVENT RECORDER. FEB. 24, 1976.
D.239,063.—STORAGE UNIT. MAR. 9, 1976.
D.239,064.—STORAGE UNIT. MAR. 9, 1976.
D.239,065.—STORAGE UNIT. MAR. 9, 1976.
D.239,066.—STORAGE UNIT. MAR. 9, 1976.
D.239,067.—STORAGE AND DISPLAY UNIT. MAR. 9, 1976.
D.239,106.—SEMICONDUCTOR EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,107.—PARALLEL RL/RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,108.—RLC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,109.—SERIES RL AND RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,110.—EDUCATIONAL DEVICE FOR LEARNING ABOUT RECTIFIERS AND FILTERS. MAR. 9, 1976.
D.239,351.—STORAGE AND DISPLAY UNIT. MAR. 30, 1976.
D.239,392.—COMPUTER CABINET. MAR. 30, 1976.
D.239,750.—STORAGE UNIT. MAY 4, 1976.
D.239,995.—STORAGE UNIT. MAY 25, 1976.
D.240,192.—DESIGN FOR MICROFILM REEL. JUNE 8, 1976.
D.240,540.—COMPUTER TERMINAL. JULY 13, 1976.
D.240,554.—DUPLICATING MACHINE WITH SORTER. JULY 13, 1976.
D.240,555.—SORTER. JULY 13, 1976.
D.240,557.—TRAY RACK. JULY 13, 1976.
D.240,965.—COIN OPERATED REPRODUCTION MACHINE. AUG. 10, 1976.
D.241,982.—ADAPTER FOR COMPRESSING HUMAN BODY ORGANS FOR X-RAY TREATMENT OR THE LIKE. OCT. 19, 1976.
D.246,226.—TONER CONTAINER OR THE LIKE. NOV. 1, 1977.
D.247,673.—STRIPPER PAD. APR. 4, 1978.
D.247,674.—STRIPPER PAD. APR. 4, 1978.
D.247,675.—STRIPPER PAD. APR. 4, 1978.

Class 26A

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.227,933.—SORTER. JULY 24, 1973.
D.236,850.—CONTROL PANEL FOR A COPIER. SEPT. 16 1975.
D.237,905.—CONTROL PANEL OF A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

D.238,818.—PLATEN COVER FOR COPIER. FEB. 10, 1976.
D.239,138.—XEROGRAPHIC COPIER. MAR. 9, 1976.

Class 26A 1

D.163,640.—XEROGRAPHIC COPYING DEVICE. JUNE 12, 1951.
D.165,993.—PAPER REGISTRATION GUIDE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 19, 1952.
D.172,906.—A XEROGRAPHIC PROCESSOR. AUG. 24, 1954.
D.186,832.—DOCUMENT REPRODUCING APPARATUS. DEC. 8, 1959.
D.188,633.—DOCUMENT REPRODUCING APPARATUS. AUG. 16, 1960.
D.193,450.—DOCUMENT REPRODUCING APPARATUS. AUG. 21, 1962.
D.194,815.—DOCUMENT REPRODUCING APPARATUS. MAR. 12, 1963.
D.200,272.—DOCUMENT REPRODUCING APPARATUS. FEB. 9, 1965. CAN. 2092730.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,558.—REPRODUCTION MACHINE. AUG. 16, 1966.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.208,337.—XEROGRAPHIC DOCUMENT REPRODUCING APPARATUS OR SIMILAR ARTICLE. AUG. 15, 1967.
D.210,558.—DOCUMENT REPRODUCING MACHINE. MAR. 19, 1968.
D.210,630.—DOCUMENT REPRODUCING APPARATUS. MAR. 26, 1968.
D.210,856.—DOCUMENT REPRODUCING APPARATUS. APR. 23, 1968.
D.214,699.—DOCUMENT REPRODUCING MACHINE. JULY 15, 1969. ARG. 0011028, CAN. 2543184, MEX. 0011135.
D.218,199.—DOCUMENT REPRODUCING MACHINE. JULY 28, 1970. CAN. 0033011, GRB. 0946459.
D.218,201.—REPRODUCTION MACHINE. JULY 28, 1970. ARG. 0014313, BEL. 0017005, CAN. 0033518, CHL. 0000996, GRB. 0946818, JAP. 0363075, MEX. 0011194, PNM. 0002073, VZL. 0000744.
D.219,889.—XEROGRAPHIC PROCESSOR HOUSING. FEB. 9, 1971.
D.221,694.—XEROGRAPHIC PROCESS HOUSING. AUG. 31, 1971.
D.227,931.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JULY 24, 1973.
D.230,513.—REPRODUCTION MACHINE. FEB. 26, 1974.
D.238,737.—COPYING MACHINE STAND. FEB. 10, 1976.
D.243,008.—COIN OPERATED REPRODUCTION MACHINE. JAN. 11, 1977.

Class 26A 2

D.214,959.—AUTOMATIC DOCUMENT FEEDING APPARATUS FOR XEROGRAPHIC REPRODUCING MACHINES OR THE LIKE. AUG. 12, 1969. CAN. 0032540, GER. DES5715, GRB. 0942720.
D.227,034.—DOCUMENT FEEDER FOR A XEROGRAPHIC REPRODUCTION. MAY 29, 1973.
D246,373.—PAPER OVERFEED TRAY. NOV. 15, 1977.

Class 26A 3

D.200,129.—XEROGRAPHIC TRANSFER AND FUSING APPARATUS. JAN. 19, 1965.
D.233,481.—XEROGRAPHIC VAPOR FUSING APPARATUS. OCT. 29, 1974.

Class 26A 4

D.201,405.—XEROGRAPHIC PRINTER. JUNE 15, 1965.
D.220,188.—MOBILE PRINTER. MAR. 16, 1971. CAN. 0033207, GER. 0MR6294, GRB. 0946460, JAP. 0443861.
D.230,517.—COMPUTER OUTPUT PRINTER. FEB. 26, 1974.
D.232,125.—CHARACTER PRINT MEMBER. JULY 16, 1974.
D.237,010.—COMBINED RIBBON AND CARTRIDGE THEREFOR. SEPT. 30, 1975. FRA. 0073134, GRB. 0967791, ITL. 0010845.
D.238,904.—CHARACTER PRINT MEMBER. FEB. 17, 1976.
D.238,968.—CHARACTER PRINT MEMBER. FEB. 24, 1976. FRA. 0073135, GER. 0009989, GRB. 0967792, ITL. 0010846.

Class 26A 5

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.

Class 26B

D.209,408.—CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,409.—MODULAR CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,872.—DOCUMENT REPRODUCING AND SORTING MACHINE. JAN. 9, 1968.
D.212,227.—A TAPE CONTRL UNIT FOR AN AUTOMATIC SORTER OR THE LIKE. SEPT. 17, 1968.
D.224,054.—XEROGRAPHIC REPRODUCTION MACHINE OR THE LIKE. JUNE 27, 1972.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.236,330.—REPRODUCTION MACHINE STACKING CART. AUG. 19, 1975.
D.236,924.—PAPER HANDLING STAND. SEPT. 30, 1975.
D.237,871.—REPRODUCTION MACHINE STACKING CART. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

Class 26C

D.205,910.—A CAN. OCT. 4, 1966.
D.208,377.—CONTAINER FOR XEROGRAPHIC TONER POWDER. AUG. 22, 1967.
D.211,928.—BOTTLE. AUG. 13, 1968.
D.218,152.—CONTAINER FOR XEROGRAPHIC POWDER. JULY 28, 1970. CAN. 0032629, GRB. 0944047.
D.236,694.—DEVELOPER MIX STORAGE CONTAINER. SEPT. 9, 1975.
D.240,201.—TONER PARTICLE STORAGE CONTAINER-DESIGN FOR TONER CARTRIDGE. JUNE 8, 1976.
D.244,007.—TONER BOTTLES. APR. 12, 1977.

Class 26D

D.216,647.—SPRING SCALE. FEB. 24, 1970. CAN. 0032577, GRB. 0943939.
D.220,011.—ARTICLE ADDRESSING MACHINE. FEB. 23, 1971.
3,666,948.—LIQUID CRYSTAL INFRARED IMAGING SYSTEM HAVING AN UNDISTURBED IMAGE ON A DISTURBED BACKGROUND. MAY 30, 1972. CAN. 0964455, GRB. 1387276.
3,737,896.—APPARATUS FOR RECOVERY OF RECORDED BIT INFORMATION IN A MAGNETIC RECORDING MEDIUM. JUNE 5, 1973. AUS. 0471989, BEL. 0790688, CAN. 1008967, STZ. 0563642.
D.246,102.—FILM REEL (DESIGN). OCT. 18, 1977.

Class 26E

D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

Class 26E 1

D.200,127.—FACSIMILE TRANSMITTER. JAN. 19, 1965.
D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.
D.215,218.—FACSIMILE TRANSCEIVER. SEPT. 16, 1969. ARG. 0010244, BEL. 0016600, CAN. 2493134, FRA. 0096592, GER. 0005411, GRB. 0939330, ITL. 0134198. MEX. 0010900.
D.218,170.—FACSIMILE TRANSCEIVER. JULY 28, 1970. GRB. 0944047.
D.225,860.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,861.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,867.—UNATTENDED TELEPHONE ANSWERING APPARATUS OR SIMILAR ARTICLE. JAN. 9, 1973.
D.227,121.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.
D.227,122.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.

Class 26E 2

D.215,849.—A ROLL-FEED APPARATUS FOR A FACSIMILE TRANSCEIVER. NOV. 4, 1969. ARG. 0011067, BEL. 0016764, CAN. 0032344, GER. DES5719, GRB. 0942723, ITL. 0138774, MEX. 0010975, PNM. 0001983, VZL. 0000663.
D.216,123.—FLEXIBLE SHEET MATERIAL GUIDE FOR A FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. NOV. 25, 1969. GRB. 0942748.
D.216,564.—GUIDE FOR FLEXIBLE SHEET MATERIAL FOR FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. FEB. 10, 1970. ARG. 0011068, BEL. 0016763,

GER. DES5716, GRB. 0942723, ITL. 0138775, MEX. 0011018, PNM. 0001401, VZL. 0000662.

Class 26E 3

D.210,589.—ELECTRONIC ADAPTER FOR FACSIMILE COMPUTER SYSTEM. MAR. 26, 1968.

Class 26F

D.203,012.—DESIGN FOR A MACHINE FOR APPLYING INTELLIGENCE TO A MOVING ARTICLE. NOV. 23, 1965.
D.244,943.—FILM REEL (DESIGN). JULY 5, 1977.
D.246,102.—FILM REEL (DESIGN). OCT. 18, 1977.
D.247,667.—FILM REEL (DESIGN). APR. 4, 1978.

Class 26F 1

D.202,746.—MICROFICHE PRINTER. NOV. 2, 1965.
D.217,739.—COMBINED MICROFILM VIEWER AND REPRODUCING MACHINE ACCESSORY. JUNE 2, 1970. CAN. 0032698.
D.218,782.—PROJECTION VIEWER. SEPT. 22, 1970. CAN. 0033031, GER. OMR6147, GRB. 0945494, JAP. 413894.
D.218,783.—COMBINATION FILM VIEWING AND REPRODUCING MACHINE. SEPT. 22, 1970. CAN. 0033032, GER. OMR6146, GRB. 0945495, JAP. 0377263.
D.233,369.—MICROFILM XEROGRAPHIC MACHINE. OCT. 22, 1974.
D.236,544.—MICROFORM VIEWER. AUG. 26, 1975.
D.239,055.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.239,056.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.247,295.—MULTICOLOR TRANSPARENCY REPRODUCTION MACHINE. FEB. 21, 1978.

Class 26G

D.225,643.—REACTION TESTING DEVICE. DEC. 26, 1972.
D.225,681.—SUCTION MOUNTING DEVICE. DEC. 26, 1972.
D.226,662.—EDUCATIONAL DEVICE FOR DEMONSTRATING MOMENTUM. APR. 10, 1973.
D.232,030.—EDUCATIONAL AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 9, 1974.
D.232,031.—COLLISION DEMONSTRATION TEACHING AID. JULY 9, 1974.
D.232,098.—TEACHING AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 16, 1974.
D.232,698.—CLAMP. SEPT. 10, 1974.
D.233,432.—TEACHING AID FOR DEMONSTRATING PRINCIPLES OF PHYSICS. OCT. 29, 1974.
D.233,654.—CONTAINER FOR BOOKLETS OR THE LIKE. NOV. 19, 1974.
D.233,658.—BALANCE SCALE. NOV. 19, 1974.
D.233,935.—EDUCATIONAL DEVICE FOR TEACHING ARITHMETIC. DEC. 17, 1974.
D.234,546.—CARRYING CASE. MAR. 18, 1975.
D.235,440.—EDUCATIONAL PLUG-IN BOARD. JUNE 17, 1975.
D.235,441.—BASIC MEASUREMENT EDUCATIONAL BOARD. JUNE 17, 1975.
D.236,028.—MAGNIFIER. JULY 22, 1975.
D.236,729.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,730.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,978.—SWITCHING EDUCATIONAL BOARD. SEPT. 30, 1975.
D.236,979.—EDUCATIONAL MEASURING DEVICE BOARD. SEPT. 30, 1975.
D.237,020.—COMBINED SUPPORT AND STORAGE TRAY FOR AN EDUCATIONAL KIT OR SIMILAR ARTICLE. SEPT. 30, 1975.
D.237,877.—MOTOR AND GENERATOR EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,878.—MULTI-METER EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,879.—EDUCATIONAL DEVICE FOR LEARNING MAGNETISM & INDUCTION. DEC. 2, 1975.
D.237,880.—EDUCATIONAL DEVICE FOR LEARNING BASIC HAND TOOLS. DEC. 2, 1975.
D.242,787.—AN EDUCATIONAL AIDE FOR MEASURING MASS. DEC. 21, 1976.
D.242,793.—EDUCATIONAL AIDE FOR TEACHING PHYSICAL PROPERTIES OF LIGHT. DEC. 21, 1976.

Class 26G 1

D.216,157.—BALANCE SCALE. NOV. 25, 1969. BEL. 0016761, CAN. 0032611, GER. DES5718, GRB. 0942720, ITL. 0128772, JAP. 0337548.
D.236,731.—CURCUIT TESTING EDUCATIONAL BOARD. SEPT. 9, 1975.

Class 26H

D.236,556.—CARRYING CASE FOR COLORISTS MATERIALS OR THE LIKE. AUG. 26, 1975.

Class 26H 1

D.215,294.—HOUSING FOR ELECTRONIC APPARATUS. SEPT. 23, 1969. ARG. 0011066, BEL. 0016760, GER. 0005765, GRB. 0942725, ITL. 0138776, MEX. 0010934, PNM. 0001839, VZL. 0000664.
D.215,660.—HOUSING FOR ELECTRONIC APPARATUS. OCT. 21, 1969.
D.234,700.—DISC DRIVE CABINET. APR. 1, 1975.
D.238,494.—CONTROL PANEL FOR DISK FILE. JAN. 20, 1976.
D.238,495.—DISK MEMORY MODULE FRONT PANEL. JAN. 20, 1976.
D.240,632.—CABINET FOR ELECTRONIC EQUIPMENT. JULY 20, 1976.
D.241,446.—SINGLE MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,447.—SINGLE MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,448.—DUAL MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,449.—DUAL MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.

Class 26H 2

D.221,228.—KEYBOARD FOR A COMPUTER OR THE LIKE. JULY 20, 1971.

Class 26H 3

D.221,229.—SEND/RECEIVE DATA PRINTER TERMINAL. JULY 20, 1971.
D.224,019.—XEND/RECEIVE DATA PRINTER TERMINAL. JUNE 27, 1972.
D.236,129.—INPUT/OUTPUT TERMINAL. JULY 29, 1975.

Class 26H 4

D.212,692.—TELEPHONE ACOUSTIC COUPLER. NOV. 12, 1968. ARG. 0010245, BEL. 0016601, CAN. 2503147, FRA. 0096593. GER. 0005410, GRB. 0939331, ITL. 1341991, MEX. 0010845.
D.224,025.—ACOUSTIC COUPLER. JUNE 27, 1972.

Class 26H 5

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.206,956.—HOLLOW CORNER PRISM. FEB. 14, 1967.
D.237,849.—COOLING RACK. DEC. 2, 1975.

Class 26H 6

D.221,108.—PAPER SHREDDER. JULY 6, 1971. CAN. 0033939.

Class 26H 7

D.221,901.—OVERHEAD PROJECTOR. SEPT. 14, 1971. CAN. 0033920.
D.231,800.—RIBBON CARTRIDGE. JUNE 11, 1974.
D.236,787.—BOOKCASE OR SIMILAR ARTICLE. SEPT. 16, 1975.
D.239,419.—TAPE CASSETTE STORAGE UNIT. MAR. 30, 1976.
D.239,472.—MAGNETIC CARD STORAGE TRAY. APR. 6, 1976.
D.239,531.—COPY HOLDER. APR. 13, 1976.
D.239,872.—CAMERA/PROJECTOR. MAY 11, 1976.
D.241,774.—PRINTER/KEYBOARD APPARATUS FOR ELECTRONIC TYPING SYSTEM OR SIMILAR ARTICLE. OCT. 5, 1976.
D.242,101.—FILE UNIT OR SIMILAR ARTICLE. NOV. 2, 1976.
D.242,102.—TABLE OR SIMILAR ARTICLE. NOV. 2, 1976.

Class 27A

3,615,614.—LIGHT DEV DIRCT PRINT SILVER HALIDE EMULSION SENSITIZD W/ COMBINTN OF COPPER, LEAD, BROMIDE AND THIOU. OCT. 26, 1971.
3,660,100.—DIRECT-PRINT LIGHT DEVELOPABLE EMULSION. MAY 2, 1972.
3,725,073.—LIGHT DEVELOPABLE DIRECT WRITING, SILVER HALIDE EMULSIONS CONTAINING GOLD, IODINE, LEAD AND COP. APR. 3, 1973. CAN. 0882613.
3,782,960.—DRCT-PRNT LIGHT-DVLPBL EMULSN CNTAING SILVER HALIDE GRAINS SNSTZD SENSTZD ON THE SURFACES W/SI. JAN. 1, 1974. BEL. 0780680, CAN. 0994590, GRB. 1384081, ITL. 0950280.
3,849,146.—DIRECT-PRINT LIGHT-DEVELOPBL SILVER HALIDE EMULSION CONTAINING CYCLIC DIOXIDE OR SELENONE AS SEN. NOV. 19, 1974.

Class 27B

3,631,232.—APPARATUS FOR SIMULATING THE ELECTRICAL CHARACTERISTICS OF A NETWORK. DEC. 28, 1971. CAN. 0951429, GRB. 1267785.

Class 27C

2,298,997.—PHOTOGRAPHIC FILM. OCT. 13, 1942.
2,317,257.—METHOD OF DYEING PHOTOGRAPHIC SILVER HALIDE EMULSIONS. APR. 20, 1943.
2,320,693.—DUPLEX PHOTOGRAPHIC MATERIAL. JUNE 1, 1943.
2,352,822.—PHOTOGRAPHIC COATING. JULY 4, 1944.
2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.
3,736,133.—TRANSPARENT INK—ABSORBENT LACQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583, GRB. 1390137, MEX. 0127276, VZL. 0033577.
3,773,513.—DIMENSIONALLY STABLE PHOTOGRAPHIC PAPER CONTAINING GLASS FIBERS. NOV. 20, 1973.

Class 27D

RE.22,654.—PHOTOGRAPHIC DEVELOPING MACHINE—RE OF 2,347,189-D3946. JULY 3, 1945.
2,347,189.—PHOTOGRAPHIC DEVELOPING MACHINE—REISSUED D348-22,654. APR. 25, 1944.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

Class 27H 1

4,077,019.—TRANSVERSE MODE CONTROL IN DOUBLE-HETEROSTRUCTURE LASERS UTILIZING SUBSTRATE LOSS. FEB. 28, 1978.

Class 30

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 30A

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.
3,707,368.—MANIFOLD IMAGING PROCESS. DEC. 26, 1972.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

Class 30B

3,642,363.—MANIFOLD IMAGING SYSTEM. FEB. 15, 1972. CAN. 0960289, GRB. 1328405, JAP. 0770137.
3,661,454.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. MAY 9, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,741,641.—MANIFOLD IMAGING APPARATUS. JUNE 26, 1973.
3,748,034.—MANIFOLD IMAGING MACHINE. JULY 24, 1973. BEL. 0777713, CAN. 0948694, FRA. 7200999, GRB. 1376661, ITL. 0946353, SPN. 0398585, SWD. 7200573.
3,761,174.—MANIFOLD WEB HANDLING. SEPT. 25, 1973.
3,768,902.—MANIFOLD IMAGING. OCT. 30, 1973.
3,876,937.—LAYER TRANSFER IMAGING SYSTEM. APR. 8, 1975. CAN. 0933996, GRB. 1282725, JAP. 0726369.
3,963,340.—IMAGING APPARATUS. JUNE 15, 1976.

Class 30C

3,615,393.—MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION. OCT. 26, 1971. BEL. 0746582, CAN. 0965829, FRA. 7007627, GRB. 1295533, ITL. 0886478, JAP. 0727962.
3,653,892.—MANIFOLD IMAGING PROCESS WHEREIN THE IMAGED ELEMENTS MAY BE RECOMBINED AND REUSED. APR. 4, 1972. CAN. 0916967, GRB. 1320407, JAP. 0731611.
3,676,116.—IMAGE REVERSAL IN MANIFOLD IMAGING USING ELECTRICALLY CONDUCTIVE RECEIVER SHEET. JULY 11, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378. GRB. 1340685, JAP. 0758465.
3,692,516.—MANIFOLD IMAGING METHOD - PHAROS MANIFOLD IMAGING REVERSAL. AUG. 19, 1972. CAN. 0929204, GRB. 1320012, JAP. 0759476.
3,692,518.—MANIFOLD IMAGING PROCESS. SEPT. 19, 1972. ARG. 0191965, BEL. 0749174, CAN. 0916496, FRA. 7013872, GRB. 1309649, ITL. 0899700, JAP. 0731228, MEX. 0116175.
3,718,462.—MANIFOLD ELECTRIFICATION PROCESS. FEB. 27, 1973. CAN. 0947366, GRB. 1313712, JAP. 0739530.
3,737,311.—ELECTROSTATIC PARTICLES TRANSFER IMAGING PROCESS. JUNE 5, 1973.
3,756,812.—MANIFOLD IMAGING PROCESS. SEPT. 4, 1973.
3,761,258.—IMAGING PROCESS EMPLOYING CHARGED DONOR AND RECEIVER SHEETS. SEPT. 25, 1973.
3,776,721.—MANIFOLD IMAGING. DEC. 4, 1973.
3,844,780.—IMAGING PROCESS. OCT. 29, 1974.
3,846,127.—IMAGING SYSTEM. NOV. 5, 1974.
3,850,626.—IMAGING MEMBER AND METHOD. NOV. 26, 1974. GRB. 1464653.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.
3,861,910.—MANIFOLD IMAGING PROCESS. JAN. 21, 1975. ARG. 0198477, BEL. 0744343, CAN. 0947363, FRA. 7001127, GRB. 1284521, ITL. 0885940, JAP. 0727960, MEX. 0111440.
3,909,257.—MANIFOLD IMAGING PROCESS WITH SPOOL ELECTRODE. SEPT. 30, 1975.

Class 30D

3,598,581.—MANIFOLD IMAGING METHOD. AUG. 10, 1971. ARG. 0198157, AUS. 0413154, BEL. 0713100, BRA. 6795099, CAN. 0889250, CHL. 0024249, CLB. 0017928, FRA. 1560020, GER. 1772114, GRB. 1200712, HOL. 0149611, ITL. 0829693, JAP. 0626106, LXB. 0055806, MEX. 0100797, NOR. 0128040, PRU. 0009737, SPN. 0352316, STZ. 0474097, SWD. 0340404, URG. 0009203, VZL. 0023690.
3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,907,558.—MANIFOLD IMAGING UTILIZING SILICA GEL ACTIVATING LAYER. SEPT. 23, 1975.
3,912,504.—MANIFOLD IMAGING WITH THERMAL ACTIVATOR CONTAINED IN A SILICA GEL LAYER. OCT. 14, 1975.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.
3,964,904.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER. JUNE 22, 1976. BEL. 0832405.
4,015,983.—A METHOD OF ERASING MANIFOLD IMAGES. APR. 5, 1977.

Class 30E

3,653,889.—METHOD OF FIXING MANIFOLD IMAGES. APR. 4, 1972. BEL. 0754024, CAN. 0921745, FRA. 7028279, GRB. 1322772, ITL. 0900939, JAP. 0739529.
3,658,519.—IMAGE TRANSFER PROCESS FROM CONDUCTIVE SUBSTRATES. APR. 25, 1972. ARG. 0195536,

AUS. 0456406, BEL. 0760747, BRA. 7022093, CAN. 0960290, FRA. 7047144, GRB. 1337590, ITL. 0913848, MEX. 0119590, SWD. 7017293.

3,706,553.—TRANSFER OF IMAGES TO A NON-CONDUCTIVE SUBSTRATE. DEC. 19, 1972. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,708,288.—IMAGE TRANSFER PROCESS. JAN. 2, 1973. CAN. 0882053, GRB. 1298922, JAP. 0757867.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,746,538.—IMAGE TRANSFER PROCESS. JULY 17, 1973. CAN. 0951781, GRB. 1374841.

3,793,017.—IMAGING FIXING METHOD. FEB. 19, 1974.

3,819,368.—MANIFOLD IMAGING MEMBER EMPLOYING A FIXATIVE LAYER. JUNE 25, 1974.

3,825,423.—IMAGE TRANSFER PROCESS. JULY 23, 1974.

3,888,208.—IMAGE TRANSFER PROCESS. JUNF 10, 1975.

Class 30F

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.

3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.

3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.

Class 30G

3,655,372.—IMAGE REVERSAL IN MANIFOLD IMAGING. APR. 11, 1972.

3,901,697.—MANIFOLD IMAGING PROCESSUSING ELECTRONICS PHOTOSENSITIVE MATERIAL SUBJECT TO LIGHT FATIGUE. AUG. 26, 1975.

Class 30H

3,649,117.—IMAGING PROCESS. MAR. 14, 1972. BEL. 0761133, CAN. 0985732, FRA. 7047700, GRB. 1340679, ITL. 0914070, JAP. 0759480.

3,918,967.—CONTACT REFLEX MANIFOLD IMAGING PROCESS. NOV. 11, 1975. ARG. 0183676, BEL. 0761132, CAN. 0949120, FRA. 7047699, GRB. 1340207, ITL. 0914069, JAP. 0770143, MEX. 0119757, VZL. 0032600.

Class 30I

3,556,783.—COLOR MANIFOLD IMAGING PROCESS. JAN. 19, 1971.

3,853,555.—METHOD OF COLOR IMAGING A LAYER OF ELECTRICALLY PHOTOSENSITIVE AGGLOMERATES. DEC. 10, 1974.

3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.

Class 31

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

4,078,923.—MIGRATION IMAGING WITH SURFACTANT-MODIFIED SOLVENT DEVELOPMENT. MAR. 14, 1978.

Class 31A

3,520,681.—PHOTOELFCTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

4,040,826.—IMAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER. AUG. 2, 1977.

4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.

Class 31B

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458, ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

3,542,465.—CAMERA WITH DEVELOPMENT MEANS. NOV. 24, 1970. CAN. 0918739, GRB. 1241846, JAP. 0650672.

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,951,324.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. APR. 20, 1976. FRA. 7439865.

4,025,183.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. MAY. 24, 1977. FRA. 7439865.

Class 31C

3,556,781.—MIGRATION IMAGING PROCESS. JAN. 19, 1971. ARG. 0175887, AUS. 0425096, BEL. 0722718, CAN. 0874909, CHL. 0024333, FRA. 1587222, GER. 1804475, GRB. 1250526, GUA. 0002124, ITL. 0855511, MEX. 0103409, PNM. 0001949, PRU. 0010349, SPN. 0359501, STZ. 0506818, SWD. 0340750, URG. 0009365, VZL. 0023713.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYR AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

3,656,990.—ELECTROSOLOGRAPHY. APR. 18, 1972. ARG. 0152723, BRA. 0084169, CAN. 0800550, CHL. 0025766. CLB. 0014944, MEX. 0086246, PNM. 0002518, PRU. 0009465, URG. 0008153, VZL. 0023999.

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.

3,713,818.—MIGRATION IMAGING SYSTEM WITH MOLTEN LIQUID DEVELOPMENT. JAN. 30, 1973. CAN. 0933580, GRB. 1358566, USR. 0463275.

3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.

3,720,513.—MIGRATION IMAGING METHOD INVOLVING SOLVENT WASH-AWAY OF UNMIGRATED PARTICLES. MAR. 13, 1973.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960,

FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277, GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,798,030.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD UTILIZING POWDER PARTICLES. MAR. 19, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,362.—IMAGING METHOD. SEPT. 17, 1974.

3,839,030.—MIGRATION IMAGING PROCESS WITH UNIFORM EXPOSURE BEFORE OR DURING THE SOFTENING STEP. OCT. 1, 1974. BEL. 0715790. CAN. 0890853, FRA. 1572571, GER. 1772523, GRB. 1234652, ITL. 0834777, JAP. 0620888.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,840,397.—PARTICLE PLACING SYSTEM. OCT. 8, 1974. ARG. 0175888, ATR. 0300561, AUS. 0427473, BEL. 0724135, CAN. 0868305, DNK. 0126727, FRA. 1593258, GER. 1810079, GRB. 1254448, ITL. 0948025, JAP. 0708364, LXB. 0057367, MEX. 0107468, NOR. 0127216, NZL. 0154542, PNM. 0002048, PTG. 0050687, SAF. 0687633, SPN. 0360458, STZ. 0501251, SWD. 0341724, VZL. 0023710.

3,866,236.—IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION. FEB. 11, 1975. CAN. 0936735, GRB. 1360623.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.

3,901,699.—MIGRATION AND AGGLOMERATION IMAGING METHOD. AUG. 26, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.

3,917,880.—ELECTROPHOTETIC IMAGING SYSTEM. NOV. 4, 1975. GRB. 1459468.

3,918,969.—MIGRATION IMAGING METHOD EMPLOYING A UNIFORM EXPOSURE STEP. NOV. 11, 1975. ARG. 0172557, ATR. 0300565, AUS. 0430615, BEL. 0726282, CAN. 0883748, DNK. 0124046, FRA. 1598888, GER. 1817222, GRB. 1257030, ITL. 0850166, JAP. 0665999, LXB. 0057692, MEX. 0107941, NOR. 0127264, NZL. 0154930. PNM. 0001958, SAF. 0688516, SPN. 0362041, STZ. 0506822, SWD. 0340953, VZL. 0023721.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,950,167.—IMAGING SYSTEM. APR. 13, 1976. FRA. 7432507.

3,960,555.—PROCESS-PESO WITH CONDUCTORLESS BASE. JUNE 1, 1976. BEL. 0713103, BRA. 0088021, CAN. 0890858, CHL. 0023981, FRA. 1576403, IND. 0115236, ITL. 0829694, LXB. 0055807, MEX. 0096676, PRU. 0009941, SAF. 68/2105, SPN. 0352317, URG. 0009135, VZL. 0023691.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,967,959.—MIGRATION IMAGING SYSTEM. JULY 6, 1976.

3,970,453.—IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER. JULY 20, 1976.

3,975,739.—MIGRATION IMAGING SYSTEM USING SHAPED ELECTRODE. AUGUST 17, 1976.

3,976,483.—FRASING PROCESS - XDM LATENT IMAGE ERASING. AUG. 24, 1976. ARG. 0184682, AUS. 0458164, BEL. 0761130, CAN. 0946911, FRA. 7047697, GRB. 1339715, ITL. 0914071, JAP. 0770138, MEX. 0119758, VZL. 0032932.

3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976

3,982,936.—DEFORMATION IMAGING SYSTEM. SEPT. 28, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.

4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.

4,021,110.—PHOTOCOPYING CAMERA AND PROCESSING DEVICE. MAY 3, 1977.

4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

4,055,418.—MIGRATION IMAGING METHOD USING AN IMAGING MEMBER EMPLOYING A SURFACE SKIN. OCT. 25, 1977.

4,081,273.—MIGRATION IMAGING METHOD. MAR. 28, 1978.

4,084,966.—IMAGING SYSTEM USING AGGLOMERABLE MIGRATION MARKING MATERIAL. APR. 18, 1978.

4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31D

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, MEX. 0106441, SPN. 0379204, SWD. 0335063, USR. 0448658. VZL. 0029780.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,740,223.—MIGRATION IMAGING STRUCTURE. JUNE 19, 1973. BRA. 6897135, CAN. 0855151, MEX. 0100800, PNM. 0002192, PRU. 0009484, VZL. 0032425.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843. BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,901,702.—MIGRATION IMAGING ELEMENT WITH ABSORBENT BLOTTER OVERLAYER. AUG. 26, 1975. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383. CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

3,998,635.—IMAGING SYSTEM. DEC. 21, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.

4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

4,040,826.—IMAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER. AUG. 2, 1977.

4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE

AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.
4,072,517.—MIGRATION IMAGING METHOD. FEB. 7, 1978.
4,081,273.—MIGRATION IMAGING METHOD. MAR. 28, 1978.
4,102,682.—IMAGING MEMBER. JULY 25, 1978.

Class 31E

3,598,644.—IMAGING MEMBER FABRICATION. AUG. 10, 1971.
3,671,282.—METHOD OF MAKING AN IMAGING MEMBER. JUNE 20, 1972. BEL. 0755384, FRA. 7031999, GRB. 1326056, ITL. 0901735.
3,971,334.—COATING DEVICE. JULY 27, 1976.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.
4,062,680.—IMAGING PROCESS EMPLOYING ELECTRICAL OR MAGNETIC REVERSE MIGRATION FORCE AND SOFTENABLE MAT. DEC. 13, 1977. BEL. 827065, FRA. 7509299, GRB. 1497825.

Class 31F

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.
3,780,307.—LIQUID CRYSTALLINE COMPOSITIONS HAVING INDUCED OPTICAL ACTIVITY. DEC. 18, 1973. CAN. 1000484, GRB. 1408059.
3,909,262.—IMAGING MIGRATION MEMBER EMPLOYING A GELATIN OVERCOATING. SEPT. 30, 1975.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,065,307.—IMAGED AGGLOMERABLE ELEMENT AND PROCESS OF IMAGING. DEC. 27, 1977. CAN. 929350, GRB. 1330518.
4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31G

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,741,758.—MIGRATION IMAGING EMPLOYING PRESSURE NIP DEVELOPMENT. JUNE 26, 1973.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141. JAP. 0766711.
3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.
3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.
3,876,445.—MIGRATION IMAGING BY SPLITTING A SOFTENABLE MATERIAL. APR. 8, 1975. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.
4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.
4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.
4,055,418.—MIGRATION IMAGING METHOD USING AN IMAGING MEMBER EMPLOYING A SURFACE SKIN. OCT. 25, 1977.
4,101,321.—IMAGING SYSTEM. JULY 18, 1978.

Class 31H

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277. GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

Class 31I

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 31J

3,648,607.—IMAGING SYSTEM-MASTER MAKING BY BINDER PESO. MAR. 14, 1972. CAN. 0920410, GRB. 1322946, JAP. 0770136.
3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

Class 31K

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.
3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 31L

3,615,394.—METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE. OCT. 26, 1971.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360. ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 32

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,746,622.—COMPOSITION AND PROCESS. JULY 17, 1973. BEL. 0783439, CAN. 0986046, FRA. 7216331, MEX. 0132353, GRB. 1388725, ITL. 0965051, SAF. 7213163, STZ. 0590297.
3,774,592.—METHOD FOR PROVIDING AN IMPROVED BODY ELECTRODE ELECTRICAL CONNECTION. NOV. 27, 1973.

3,884,685.—LOW DENSITY PAPER USED IN TRANSFER ELECTROPHOTOGRAPHY. MAY 20, 1975. ARG. 0185573, ATR. 0314353, AUS. 0463544, BEL. 0768990, CAN. 9780051, CHL. 0027015, FRA. 7124553, GRB. 1353372, ITL. 0931092, MEX. 0124810, NOR. 0134805, NZL. 0164088, PNM. 0002462, SPN. 0392720, SWD. 0368995.

3,891,990.—IMAGING PROCESS USING DONOR MATERIAL. JUNE 24, 1975. GRB. 1459468.

3,946,172.—A LATCHING APPARATUS. MAR. 23, 1976. GRB. 1429530.

3,946,401.—ELECTROTHERMOGRAPHIC IMAGE PRODUCING TECHNIQUES. MAR. 23, 1976.

3,952,798.—INTERNALLY HEATED HEAT PIPE ROLLER-INTERNALLY HEATED HEAT PIPE. APR. 27, 1976. CAN. 0968341. GRB. 1368100.

3,971,950.—INDEPENDENT COMPRESSION AND POSITIONING DEVICE FOR USE IN MAMMOGRAPHY. JULY 27, 1976.

3,975,681.—ELECTRODE FOR MEASURING THICKNESS OF DIELECTRIC LAYERS ON CONDUCTIVE SUBSTRATES. AUG. 17, 1976.

3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.

3,997,498.—NON-SMUDGE CORRECTION FLUID. DEC. 14, 1976.

4,010,366.—MEASUREMENT OF THE MASS & CHARGE OF CHARGED CIRCUITS. MAR. 1, 1977.

4,018,953.—COATING METHOD. APR. 19, 1977.

4,020,210.—ENCAPSULATED WATER. APR. 26, 1977.

4,020,268.—AGAROSE CONTAINING AFFINITY MATRIX MATERIALS. APR. 26, 1977. BEL. 0783439, CAN. 0986046, FRA. 7216331, GRB. 1388725, ITL. 0965051, MEX. 0132353, SAF. 7213163, STZ. 0590297.

4,046,404.—CARBONLESS PAPER FOR USE IN ELECTROSTATOGRAPHIC COPIERS. SEPT. ,6 1977.

4,046,473.—PHOTORECEPTOR METHOD AND SYSTEM. SEPT. 6, 1977.

4,047,973.—RECOVERY OF SELENIUM AND SELENIUM ALLOYS BY HYDRAULIC LATHING. SEPT. 13, 1977.

4,059,353.—PHOTORECEPTOR BELT SYSTEM. NOV. 22, 1977.

4,074,000.—PRESSURE SENSITIVE ADHESIVE DRAFTING FILMS FOR USE IN ELECTROSTATOGRAPHIC COPIERS. FEB. 14, 1978.

4,085,245.—TRANSPARENCIES FOR COLOR XEROGRAPHIC COPIES. APR. 18, 1978.

4,097,267.—PURIFICATION AND REALLOYING OF ARSENIC/SELENIUM ALLOYS. JUNE 27, 1978.

4,097,273.—ARSENIC/SELENIUM RECOVERY. JUNE 27, 1978.

Class 32A

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DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 7, 1978

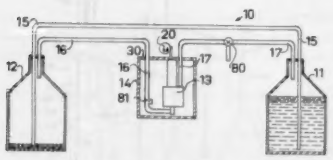
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T976,001
LIQUID CRYOGEN TRANSFER SYSTEM

Thomas W. Schuck, 34 Old Orchard Dr., Easton, Pa. 18042

Continuation of Ser. No. 754,751, Dec. 27, 1976, abandoned.
This application Dec. 2, 1977, Ser. No. 856,831
Int. Cl.[2] F17C *7/02*
U.S. Cl. 62—55
1 Sheet Drawing. 19 Pages Specification



A system and method are provided for transferring a liquid cryogen from a supply tank to a receiver tank by pressurizing the supply tank with cold vapor from the receiver tank. This method minimizes heat added to the transferred liquid and minimizes the temperature of the vapor returned to the supply tank, making it particularly useful for optimizing the transfer of liquid cryogens such as helium, hydrogen, nitrogen and oxygen which vaporize well below ambient temperatures. A cold vapor pump is provided which is insulated from ambient temperatures for pumping the cryogen vapor from the receiver tank to the supply tank with a minimum of heat input.

T976,002
TOOTHPASTE CONTAINING BENZYL HYDROXYETHYL CELLULOSE AS A BINDER

Charles W. Vanderslice, 3505 Golf View Dr., Newark, Del. 19702

Filed Jan. 9, 1978, Ser. No. 867,855
Int. Cl.[2] A61K *7/16, 7/22*
U.S. Cl. 424—49
No Drawing. 9 Pages Specification

Dentifrice compositions are disclosed which use as a binder and thickener specified modified hydroxyethyl cellulose ethers in place of the conventional carboxymethyl cellulose. Specifically, the ethers disclosed for such use are benzyl hydroxyethyl cellulose having a benzyl D.S. of about 0.09 to 0.15 and hydroxyethyl cellulose M.S. of about 2 to 2.5. Phenylhydroxyethyl or butyl groups in the same proportions can be present in lieu of the benzyl group. Other ingredients are conventional dentifrice ingredients. Such compositions are particularly useful in antiseptic toothpastes, making use of ionic antiseptic materials, since these specified cellulose ethers do not precipitate in ionic solutions as does carboxymethyl cellulose.

T976,003
WEAR RESISTANT NICKEL-ZINC FERRITE

William D. Kehr, 7155 Mt. Sherman Rd., Longmont, Colo. 80501, and Harold L. Turk, 1623 Puerto Vallarta, San Jose, Calif. 95120

Filed Nov. 18, 1977, Ser. No. 852,992
Int. Cl.[2] C04B *35/30*
U.S. Cl. 252—62.62
2 Sheets Drawing. 10 Pages Specification

A nickel-zinc ferrite material suitable for use in magnetic heads is disclosed. The material has a general empirical formula

$$(Ni_{1-y}Zn_y)_{1-x}\,Fe_{2+z}\,O_{3.99}$$

wherein x is less than 0 and greater than -0.040, y is from about 0.44 to about 0.58, and wherein the ratio of %NiO/%ZnO is from about 0.72 to about 1.27, and wherein the mole percent of NiO is from about 21.5 to about 28.5%, and the mole percent ZnO is from about 22.5 to about 29.5%, and the mole percent Fe_2O_3 is from about 48 to about 50%. More specific composition ranges as well as a preferred composition are also disclosed.

DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 7, 1978

REISSUES

NOVEMBER 7, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

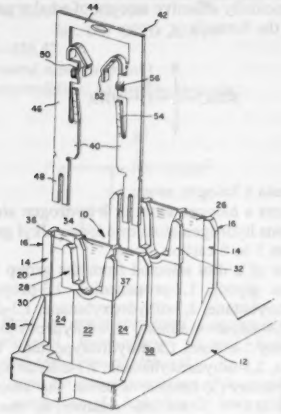
Re. 29,822
ELECTRICAL CONTACT SYSTEM

Wilmer L. Sheesley, Dauphin, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Original No. 4,030,791, dated Jun. 21, 1977, Ser. No. 712,309, Aug. 6, 1976. Application for reissue Sep. 2, 1977, Ser. No. 830,228

Int. Cl.[2] H01R *39/00*

U.S. Cl. 339—5 M **2 Claims**



1. An electrical contact system for supplying a current from a circuit board to a motor suspended between two walls which comprises:

a. two pair of *two* conductive contact members *each* with one member of each pair being the mirror image of the other member, [each contact member positioned over an edge of an opposing surface of said walls and] *said contact members being positioned along each side of each wall with each pair facing the other pair, each member* having an elongated body with contact means on its lower end adapted to electrically engage a circuit on a circuit board and on the upper end a cantilever spring arm extending generally in a curving manner from the body so that the [arm's free end projects downwardly, said free end being arcuate and facing the arcuate free end] *arm projects downwardly, said arm having an arcuate contact surface thereon facing the arcuate contact surface* of the contact member [position near] *positioned on* the other side of the same wall; and

b. two pair of conductive collet tabs each having a cylindrical tube section and a strap extending laterally from the base of the cylindrical tube section each pair of collet tabs being positioned on opposite ends of the motor with electrical wires therefrom being fixed to said straps so that when the motor is suspended between the two walls said cylindrical tube sections are received in the arcuate free ends of the cantilever spring arms whereby an electrical current may pass from the circuit board to the motor.

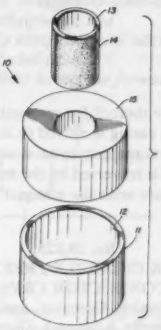
Re. 29,823
RESILIENT BUSHING WITH LONG FATIGUE LIFE

David L. Sievers; Gary L. Hipsher, both of Logansport, Ind., and Robert Vosburgh, deceased, late of Royal Oak, Mich., assignors to The General Tire & Rubber Co., Akron, Ohio

Original No. 3,893,775, dated Jul. 8, 1975, Ser. No. 468,970, May 13, 1974. Application for reissue Jul. 21, 1977, Ser. No. 817,654

Int. Cl.[2] F16B *1/00*

U.S. Cl. 403—225 **13 Claims**



2. A resilient bushing comprising:

an outer rigid member having curvilinear inner surface portions;

an inner rigid member having curvilinear outer surface portions;

at least one of said surface portions being provided as a sandblasted surface with an effective phosphate coating formed on said surface to define an effective roughness surface height rating selected in accordance with SAE Standard J448a; and

an elastomeric insert compressively positioned between said inner surface portions of the outer member and said outer surface portions of the inner member.

Re. 29,824
APPARATUS FOR CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS

Wolfgang Keller, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Original No. 3,989,468, dated Nov. 2, 1976, Ser. No. 637,986, Dec. 5, 1975. Division of Ser. No. 580,548, May 27, 1975, Pat. No. 3,961,906, which is a division of Ser. No. 525,641, Nov. 20, 1974, Pat. No. 3,923,468. Application for reissue Mar. 17, 1977, Ser. No. 778,541

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1973, 2358300

Int. Cl.[2] B01J *17/10;* **C01B** *33/02*

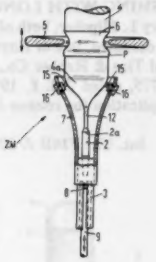
U.S. Cl. 422—250 **3 Claims**

1. In a device for crucible-free zone melt processing of a semiconductor crystal rod comprising:

an operative crucible-free zone melt apparatus including two vertically opposing approximately coaxially mounted members for supporting a semiconductor rod within said apparatus, a means for generating an annular melt zone on a portion of said semiconductor rod and a means for moving said melt zone along the length of said rod; the improvement comprising

a funnel-shaped casing coupled to one of said mounting

members in an axially movable manner in relation to said one mounting member, said casing being movable to an uppermost position for encompassing a cone area of the rod supported between said mounting members, and having relatively low melting pure metal inserts along the



upper periphery thereof for contacting adjacent rod portions when said casing is moved to its uppermost position, said metal inserts melting upon contact with the still-hot rod as such rod is traversed by the melt zone so as to form a eutectic mixture with the material of the rod.

Re. 29,825

APPARATUS FOR CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS

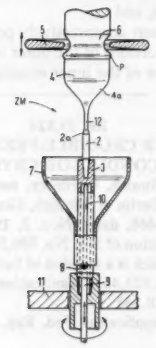
Wolfgang Keller, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Original No. 3,996,011, dated Dec. 7, 1976, Ser. No. 638,302, Dec. 8, 1975. Division of Ser. No. 580,548, May 27, 1975, Pat. No. 3,961,906, which is a division of Ser. No. 525,641, Nov. 20, 1974, Pat. No. 3,923,468. Application for reissue Mar. 17, 1977, Ser. No. 778,700

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1973, 2358300

Int. Cl.[2] B01J *17/10;* C01B *33/02*

U.S. Cl. 422—250 **2 Claims**



1. A device for crucible-free zone melt processing of a semiconductor crystal rod comprising:

an operative crucible-free zone melt apparatus including two vertically opposing approximately coaxially mounted members for supporting a semiconductor rod within said apparatus; and a funnel-shaped casing coupled to the lower of said mounting members in an axially movable manner in relation to said one mounting member, said casing being movable to an uppermost position for encompassing a cone area of the rod supported between said mounting members and being filled with a molten metal selected from the class consisting of lead, indium and aluminum, which is re-solidifies on contact with said rod.

Re. 29,826

STABILIZED NON-MEDICAL FUNGICIDAL, BACTERICIDAL AND ALGICIDAL COMPOSITION

Kazumi Konya, Shimizu; Yoshihiro Konagai, Shizuoka; Makoto Mato; Hironari Sato, both of Shimizu, and Yoshio Takahashi, Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Original No. 4,022,605, dated May 10, 1977, Ser. No. 590,074, Jun. 25, 1975. Application for reissue Oct. 5, 1977, Ser. No. 839,758

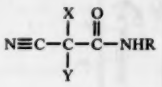
Claims priority, application Japan, Jun. 29, 1974, 49-74644

Int. Cl.[2] A01N *9/02*

U.S. Cl. 71—67 **8 Claims**

1. A stabilized microbiocidal composition which consists essentially of:

a microbiocidally effective amount of a halocyanoacetamide having the formula



(I)

wherein

X represents a halogen atom;

Y represents a halogen atom or a hydrogen atom; and

R represents hydrogen atom or a lower alkyl group containing from 1 to 8 carbon atoms;

a stabilizer of a diol selected from the group consisting of ethylene glycol, 1,2-propanediol, 1,3-propanediol, 1,2-dihydroxybutane, 2,3-dihydroxybutane, 1,3-dihydroxybutane, *1,4-dihydroxybutane,* 1,4-dihydroxy-2-butyne, 1,4-dihydroxy-2-butene, 1,5-dihydroxypentane, 1,6-dihydroxyhexane, 2,5-dihydroxyhexane, 1,7-dihydroxyheptane and 2,5-dihydroxy-(3)-hexene, wherein the amount of stabilizer is 0.1 - 5 wt. % relative to the amount of halocyanoacetamide; and

a solvent.

Re. 29,827

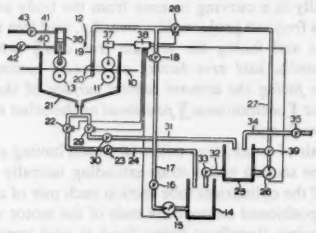
COMPOSITIONS AND PROCESSES FOR PRODUCING CHROMIUM CONVERSION COATINGS ON SURFACES OF ZINC OR CADMIUM

Michael W. Prust, Grimsby, and Wayne C. Glassman, Willowdale, both of Canada, assignors to Dominion Foundries and Steel, Limited, Hamilton, Canada

Original No. 3,857,739, dated Dec. 31, 1974, Ser. No. 285,314, Aug. 31, 1972. Application for reissue Nov. 1, 1976, Ser. No. 737,791

Int. Cl.[2] C23F *7/26*

U.S. Cl. 148—6.2 **13 Claims**



1. A composition for producing a chromate protective coating on a surface comprising zinc or cadmium the composition *having a pH less than 1.15 and* consisting of [an aqueous solution of pH less than 1.15 containing] *demineralised water,* a

source of chromium ion, *chromium being the only metallic ion present,* the chromium ion being present in the amount of 5–15 grams per liter, a source of perchlorate ion, the perchlorate ion being present in the amount [of 0.5 to 0.85 grams per liter] *corresponding to from 0.3 to 0.5 ml of 60 percent perchloric acid per liter,* and a source of fluoride ion, the fluoride ion being present in the amount [of 0.1 to 0.27 grams] *corresponding to from 0.1 to 0.25 ml of 48 percent hydrofluoric acid* per liter.

Re. 29,828

1-SUBSTITUTED-3-AMIDOPYRROLIDINES

Carl D. Lunsford, Richmond, Va., and Grover C. Helsley, Pottersville, N.J., assignors to A. H. Robins Company, Inc., Richmond, Va.

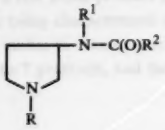
Original No. 3,577,440, dated May 4, 1971, Ser. No. 874,986, Nov. 7, 1969. Continuation of Ser. No. 545,551, Jan. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 786,420, Dec. 23, 1968, abandoned. Application for reissue Sep. 2, 1976, Ser. No. 719,974

Int. Cl.[2] **C07D** *207/14*

U.S. Cl. 260—326.47 **18 Claims**

16. A compound selected from

(a) 3-amidopyrrolidines having the formula:



wherein;

R is phenyl,

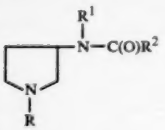
R^1 is selected from the group consisting of hydrogen, loweralkyl, phenyl, cyclohexyl, lower-alkoxy phenyl, hydroxyphenyl, halophenyl and trifluoromethylphenyl,

R^2 is selected from the group consisting of lower-alkyl, phenyl, nitrophenyl, aminophenyl, halophenyl, lower-alkoxy-phenyl, phenoxy-lower-alkyl, halophenoxy-lower-alkyl, lowwer-alkylphenyl and trifluoromethylphenyl, and

(b) pharmaceutically acceptable acid addition salts thereof.

17. A compound selected from

(a) 3-amidopyrrolidines having the formula:



wherein;

R is phenoxy-lower alkyl,

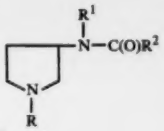
R^1 is selected from the group consisting of hydrogen, lower-alkyl, phenyl, cyclohexyl, lower-alkoxy phenyl, hydroxyphenyl, halophenyl and trifluoromethylphenyl,

R^2 is selected from the group consisting of lower-alkyl, phenyl, nitrophenyl, aminophenyl, halophenyl, lower-alkoxy-phenyl, phenoxy-lower-alkyl, halophenoxy-lower-alkyl, lower-alkylphenyl and trifluoromethylphenyl, and

(b) pharmaceutically acceptable acid addition salts thereof.

18. A compound selected from

(a) 3-amidopyrrolidines having the formula:



wherein;

R is cyclohexyl,

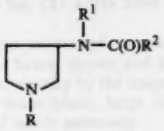
R^1 is selected from the group consisting of hydrogen, loweralkyl, phenyl, cyclohexyl, lower-alkoxy phenyl, hydroxyphenyl, halophenyl and trifluoromethylphenyl,

R^2 is selected from the group consisting of lower-alkyl, phenyl, nitrophenyl, aminophenyl, halophenyl, lower-alkoxy-phenyl, phenoxy-lower-alkyl, halophenoxy-lower-alkyl, lower-alkylphenyl and trifluoromethylphenyl, and

(b) pharmaceutically acceptable acid addition salts thereof.

19. A compound selected from

(a) 3-amidopyrrolidines having the formula:



wherein;

R is phenyllower-alkyl,

R^1 is selected from the group consisting of hydrogen, loweralkyl, phenyl, cyclohexyl, lower-alkoxy phenyl, hydroxyphenyl, halophenyl and trifluoromethylphenyl,

R^2 is selected from the group consisting of lower-alkyl, phenyl, nitrophenyl, aminophenyl, halophenyl, lower-alkoxy-phenyl, phenoxy-lower-alkyl, halophenoxy-lower-alkyl, lower-alkylphenyl and trifluoromethylphenyl, and

(b) pharmaceutically acceptable acid addition salts thereof.

Re. 29,829

INSECT REPELLENT COMPOSITIONS AND PROCESS HAVING AN N-SUBSTITUTED HYDROXYALKYL AMINE AS AN ACTIVE INGREDIENT

Carl Bordenca, Rocky River, Ohio; Kenneth P. Dorschner, Vienna, Va., and Robert P. Johnson, Baton Rouge, La., assignors to SCM Corporation, New York, N.Y.

Original No. 3,933,915, dated Jan. 20, 1976, Ser. No. 470,632, May 16, 1974. Continuation of Ser. No. 265,673, Jun. 23, 1972, abandoned, which is a continuation-in-part of Ser. No. 189,464, Oct. 14, 1971, abandoned. Application for reissue Jan. 24, 1977, Ser. No. 761,672

Int. Cl.[2] **C07C** *91/06;* **A01N** *9/20*

U.S. Cl. 260—584 R **10 Claims**

6. An amine of the formula

wherein R is a hydroxyalkyl group having from 2 to 6 carbon atoms R' is an acyclic monoterpenyl radical, and R'' is either a hydrogen atom or the same as R'.

PLANT PATENTS

GRANTED NOVEMBER 7, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,330

ROSE PLANT

Georges Delbard, Paris, France, assignor to Armstrong Nurseries, Inc., Ontario, Calif.

Filed Nov. 30, 1977, Ser. No. 855,959

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—22 **1 Claim**

1. The new and distinct variety of Floribunda rose plant substantially as described and illustrated herein, said plant being of free to vigorous growth habit, and having numerous stipitate glands and a few small prickles on its peduncles, the flowers of said plant being characterized in that they are from about 3¼ to about 4 inches in diameter, and comprise from 25 to 36 petals with 5 to 7 petaloids, and have an overall coloration which is substantially entirely expressed in shades of orange.

4,331

ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Nov. 18, 1977, Ser. No. 852,964

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—26 **1 Claim**

1. A new and distinct cultivar of rose plant of the Floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its uniform, compact, dense plant, large foliage, well-formed, coral pink blooms of heavy substance.

PATENTS

GRANTED NOV. 7, 1978

ERRATA

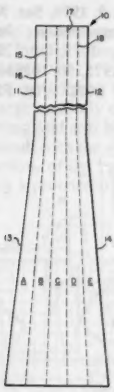
For CLASS	See PATENT NO.
405–068	4,123,911
405–220	4,123,912
405–244	4,123,913
029–798	4,124,050
418–094	4,124,060
237–002 B	4,124,177
237–019	4,124,178
237–028	4,124,179
254–089 R	4,124,191
422–181	4,124,357
252–301.19	4,124,484
210–134	4,124,488
521–026	4,124,544
521–129	4,124,545
528–177	4,124,566
528–168	4,124,567
528–059	4,124,568
528–061	4,124,569
528–273	4,124,570
528–076	4,124,572
528–053	4,124,573
528–076	4,124,574
528–018	4,124,575
546–090	4,124,587
546–021	4,124,588
546–070	4,124,589
546–221	4,124,590
562–503	4,124,624
562–503	4,124,625
424–118	4,124,626
562–598	4,124,633
562–532	4,124,634
562–533	4,124,635
562–402	4,124,636
568–671	4,124,647
568–817	4,124,648
264–000.5	4,124,659
156–637	4,124,698

PATENTS

GRANTED NOVEMBER 7, 1978

GENERAL AND MECHANICAL

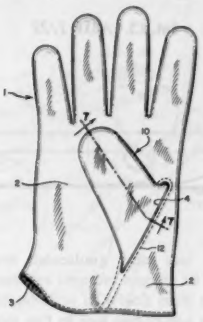
4,123,802
FOLDED TIE LINER
Myron H. Ackerman, 2691 S. Course Dr., Bldg. 19, Pompano Beach, Fla. 33060
Filed Sep. 8, 1977, Ser. No. 831,368
Int. Cl.[2] A41D *25/16*
U.S. Cl. 2—144 **7 Claims**



1. A four-in-hand necktie, comprising
an elongate fabric casing having therethrough an elongate central opening, and adapted to be tied intermediate its ends into a knot, when the necktie is in use, and
a pre-folded, like-weight fabric liner positioned in the central opening in said casing to improve the body and feel of the necktie,
said liner comprising an elongate piece of fabric folded about a plurality of longitudinally extending fold lines to position at least three longitudinally extending portions of the liner in superposed, substantially registering relation in said casing,
said superposed portions of said liner extending continuously through said casing from at least a point adjacent one end of said opening in the casing at least to a point adjacent the opposite end of said opening, whereby said superposed portions extend beyond opposite sides, respectively, of the knot formed in said casing, when the necktie is in use, and
each of said superposed portions of the folded liner having at least two longitudinal edges thereof movable relative to the adjacent superposed portions of the liner.

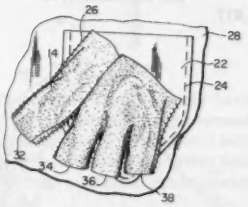
4,123,803
THUMB CONSTRUCTION FOR A GLOVE
Dixie L. Rinehart, Aspen, Colo., assignor to Wells-Lamont Corporation, Chicago, Ill.
Filed Nov. 17, 1977, Ser. No. 852,471
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—163 **6 Claims**

1. A glove having a back piece, a palm piece and a thumb construction, the improvement comprising in that said palm piece has a substantially straight slit having parallel sides cut therein extending approximately 30° with respect to the longitudinal axis of the palm piece; in that said thumb construction comprises two similarly shaped elongated panels each having a longitudinal axis, a rounded end, a straight side joining the rounded end and an enlarged base portion adjacent said straight side and opposite said rounded end with said panels being united together along a line opposite their straight sides; in that said panels are joined together along their straight sides and along their rounded ends; and in that said enlarged bases



are joined to the edges of said slit with the longitudinal axes of said panels being inclined with respect to said slit.

4,123,804
GLOVE POCKETS
Joseph Michael, 103 McAvoy Ave., and Louis R. Siringo, 8102 Buena Vista Dr., both of Rome, N.Y. 13440
Filed Jan. 5, 1977, Ser. No. 756,935
Int. Cl.[2] A41D *27/20*
U.S. Cl. 2—247 **3 Claims**



1. In a pants garment of the type adapted for covering the human form and including at least one conventional rear pocket, the improvement comprising a supplemental outer pocket which is conformed as a half glove upon a portion of the exterior garment surface which includes said rear pocket, said supplemental outer pocket being further defined by a sheet of material which is secured, at its edges, to said exterior surface portion to thereby define a hand-supporting concavity with respect to said exterior surface which defines the palm-engaging surface of the combination, wherein further the half-glove sheet material has an aperture defined to allow entrance and complete encircling of the fingers of a human hand which is placed therein, characterized in that said half-glove is angularly disposed with respect to said conventional rear pocket so as to allow a person other than the garment wearer to insert his or her hand while both are walking in a side-by-side fashion.

4,123,805

ARTIFICIAL HEART VALVE

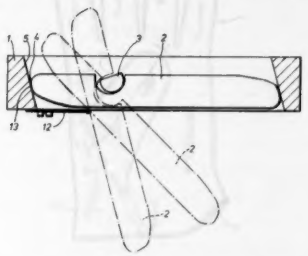
Carl Kramer, Aachen, and Hans J. Gerhardt, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 7, 1977, Ser. No. 775,350

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1976, 2612810

Int. Cl.[2] A61F *1/22*

U.S. Cl. 3—1.5 **6 Claims**



1. An artificial heart valve comprising a valve ring obtained by making an oblique cut at an angle α_1 no greater than 10° through a hollow cylinder and a valve flap obtained by making an oblique cut at an angle α_2 slightly greater than α_1 through a cylinder of circular cross-section which forms the core of the hollow cylinder and means pivotally mounting the valve flap eccentrically in the valve ring for movement between an open position and a closed position wherein the circumferential surface thereof cooperates with the internal contour of the valve ring to form a sealing line around the circumference of the valve flap.

4,123,806

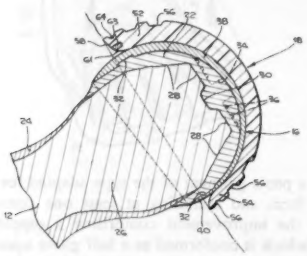
TOTAL HIP JOINT REPLACEMENT

Harlan C. Amstutz, Pacific Palisades, and Ian C. Clarke, Santa Monica, both of Calif., assignors to Regents of the University of California, Berkeley, Calif.

Filed Jan. 31, 1977, Ser. No. 764,184

Int. Cl.[2] A61F *1/24*

U.S. Cl. 3—1.912 **24 Claims**



13. An artificial surfacing for hip joints for mounting on the upper end of the femur comprising:

a thin eccentric, asymmetric substantially hemispherical, biologically inert metal shell having a smooth spherical exterior surface, and an internal surface which includes interlocking recesses and grooves;

said metal shell having an upper side wall which is substantially thicker than its lower side wall,

the maximum thickness of said metal shell being less than 10 millimeters; and

said metal shell having a spherical extend slightly greater than hemispherical, and being provided with an inner groove extending generally parallel to its edge to facilitate firm securing of the shell in position, and said shell being free of inwardly directed extended protrusions, whereby said shell will interlock with but not divide or compartmentalize cement with which it may be used.

4,123,807

RETRACTABLE BIDET

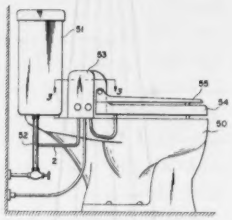
Tomio Oguma, Anjo; Shinji Kawai, Tokyo; Naoki Minamoto, Kariya; Yuji Yamaguchi, and Tetsuo Makino, both of Anjo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 9, 1976, Ser. No. 704,037

Claims priority, application Japan, Aug. 8, 1975, 50/110227[U]; Sep. 1, 1975, 50/120558[U]; Jul. 10, 1975, 50/85007[U]; Jul. 25, 1975, 50/103934[U]

Int. Cl.[2] E03D *9/08*; F24H *1/00*

U.S. Cl. 4—7 **6 Claims**



1. A sanitary device for association with a toilet seat of the type having a central opening and an upper portion adapted to be contacted by a portion of the body of a user, said sanitary device comprising

a fluid pressure source;

a hot water tank connected with said fluid pressure source;

a heater within said tank for heating water therein to a predetermined temperature; and

a cleansing mechanism comprising

a cylinder disposed within said tank so as to be heated by heated water in said tank, said cylinder being outwardly open,

a piston section mounted in said cylinder for sliding movement between inward and outward positions therein,

a passage-defining section extending from said piston section and defining a passage, at least a substantial portion of said passage disposed within said cylinder when said piston section is in its inward position, for being heated by said heated cylinder,

a nozzle section at an outer end of said passage-defining section and communicating with said passage for spraying heated water into an area to be cleansed, and

means communicating said piston section with pressurized water in said tank for sliding said piston section outwardly to extend said passage-defining section outwardly of said cylinder with minimal cooling of water occurring during travel of said water through said heated passage-defining section.

4,123,808

BATHTUB WITH SPRAY OUTLET CONVERTED TO RECTO-GENITAL CLEANSING DEVICE

Anthony T. Guarrera, 16-23 Third Ave., New York, N.Y. 10028

Filed Mar. 31, 1977, Ser. No. 783,261

Int. Cl.[2] A47K *3/22*

U.S. Cl. 4—7 **8 Claims**

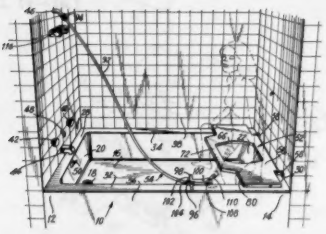
1. In a bathroom including a first wall, a bathtub converted for facile recto-genital cleansing,

(I) said bathtub comprising

(A) a base,

(B) a head end,

(C) a foot end,
(D) sides, and
(E) a rim including portions at the sides, said side rim portions being horizontally coplanar,
(II) said bathtub having its foot end against said first wall,
(III) said bathroom having a second wall against the head end of the bathtub,
(IV) said bathtub having associated therewith means for delivering water in a solid stream into the bathtub from a high point at the said first wall,
(V) means for regulating the pressure and temperature of said stream of water,
(VI) a shower arm, and
(VII) means for selectively directing water to the shower arm or to the means for delivering the solid stream of water to the bathtub, and
(VIII) that improvement including:
(A) a seat having a large centrally disposed opening,
(B) means for supporting said seat horizontally across the head end of the bathtub with the sides of the seat resting on the side rim portions of the bathtub,
(C) said seat including a protrusion forward of the opening in the seat,



(D) said protrusion having side edges which are spaced apart and against which the sides of a woman's calves adjacent to her knees are engaged when a woman sits on the seat to compel the woman to spread her legs and to transversely tense her vulvar cleft and to open her vagina to expose the mouth and vestibule thereof,
(E) an elongated flexible conduit at least seven feet long and having one end connected to the free end of the shower arm,
(F) a stand resting stably on the bottom of the bathtub near the head end thereof and supporting a spray head,
(G) means connecting the other end of the conduit to the spray head,
(H) said stand being disposed on the bottom of the bathtub centrally thereof and the conduit being long enough to locate the spray head slightly forwardly of the center of the opening,
(I) said spray head being swivelably mounted on the stand and adjustable by the user to direct the spray when water is supplied to the head at an anatomically correct angle for the woman, and
(J) means to connect the seat to the second wall of the bathroom for rotation about a horizontal axis between a horizontal position and an upright position.

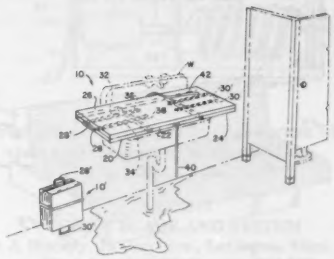
4,123,809

PORTABLE CHANGER-SURFACE FOR INFANTS

Joan E. Pugh, 322 Roxbury Ct., Joppa, Md. 21085

Filed Aug. 30, 1977, Ser. No. 829,063
Int. Cl.[2] A47K *3/12, 3/164*
U.S. Cl. 4—185 B **8 Claims**

1. In a portable structure having plural members unfoldable in end-to-end configuration to form a surface upon which to support infants for changing, bathing and the like, the improvement comprising: means hinging said members together; and end accessible means for maintaining, at a first position, said plural members aligned when unfolded in end-to-end configuration, and for permitting, at a second position, folding of said plural members about the hinging means, the end-accessible means comprising a rod structure at each end of said configuration longitudinally slidable relative to said plural members in



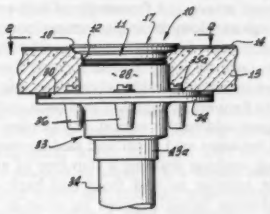
respective apertures therealong from said first position in which said rod structures together engage all said plural members to said second position in which each rod structure retracts to a respective end of said end-to-end configuration for permitting said folding.

4,123,810

DRAIN AND REMOVABLE GOOSENECK STRUCTURE

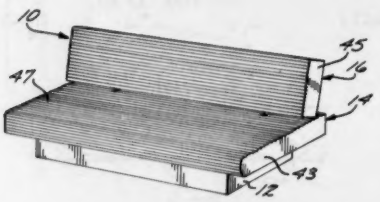
Robert A. Oropallo, Los Angeles, Calif., assignor to American Brass & Aluminum Foundry Co., Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 749,827, Dec. 13, 1976, Pat. No. 4,092,745. This application May 16, 1977, Ser. No. 796,976
Int. Cl.[2] E03C *1/26*
U.S. Cl. 4—288 **9 Claims**



1. In combination with a drain assembly having a downwardly projecting threaded stem, the improvement comprising
(a) a tube having an upwardly opening bore below the stem,
(b) an annular part having a skirt adjustably fitting said bore to be bonded thereto at selected elevation and penetration into the bore, and
(c) a nut relatively rotatably interfitting said part and retained thereto, said part having an annular portion projecting upwardly and telescopically relative to the nut,
(d) the nut telescopically interfitting the stem and having threaded connection therewith, whereby upward tightening of the nut on the stem operates to energize a seal between said part annular portion and said stem, and said nut is disconnectible from the stem to enable cleaning of the interior of the nut, part and tube,
(e) the nut having an in-turned portion spaced above said tube and rotatably received in an annular recess formed by said part annular portion, below said threaded connection of the nut with the stem, said part projecting radially outwardly between the lowermost extent of said nut and an uppermost extent of said tube, and said part projecting radially outwardly between the bottom of the stem and an upper edge defined by said nut in-turned portion, whereby the nut is rotatably captivated by said part.

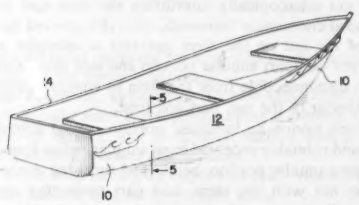
4,123,811
CONVERTIBLE SOFA BED AND COVER
Elphious Aldana, Los Angeles, Calif., assignor to Kustom Fit Manufacturing Company, South Gate, Calif.
Filed Nov. 11, 1977, Ser. No. 850,774
Int. Cl.[2] A47C *17/16*
U.S. Cl. 5—43 4 Claims



1. In a convertible sofa bed comprising: a frame; a seat portion including a seat cushion having a generally horizontal support surface characterized by a forward terminus and a rearward terminus; a back portion including a back cushion and adapted for movement between a generally horizontal bed position and a generally upright sofa position, said back cushion having, in said bed position, a generally horizontal support surface characterized by a forward terminus; pivot means pivotally connected to said seat and back portions and to said frame, and operative to orient said back portion in said bed position, with said rearward terminus of said seat cushion and said forward terminus of said back cushion in abutment whereby said support surfaces of said back and seat cushions form a substantially continuous horizontal bed surface, said pivot means further being operative to orient said back portion in said sofa position, with said forward terminus of said back cushion located above and forwardly of said rearward terminus of said seat cushion; the improvement comprising:

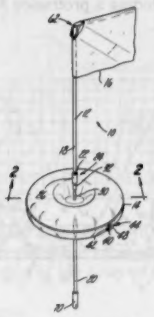
a flexible cover fixed in position upon said support surface of said seat cushion along a seam located forwardly of said rearward terminus of said seat cushion, said cover extending to the forward terminus of said back cushion and being fixed upon said back cushion, the portion of said cover located between said seam and said forward terminus of said back cushion defining a flap free of attachment and movable relative to said front and back cushions, said cover thereby being exposed to view in both said bed position and said sofa position.

4,123,812
DECORATIVE SPLASH RAILS FOR BOATS
Kenneth F. Owens, Koger Executive Center, Albany Bldg., 8400 NW. 52 St., Suite #218, Miami, Fla. 33166
Filed Mar. 25, 1977, Ser. No. 781,153
Int. Cl.[2] B60R *13/04*
U.S. Cl. 9—1.1 4 Claims



1. A decorative splash rail for boats comprising an elongate sheet, said sheet having one external surface including a decorative repeated design thereon along the length of said sheet, a portion of said one external surface of said sheet defining the marginal edges of said design, said portion of said one external surface having a curvature bulging outwardly from the remaining portions of said one external surface, a bouyant closed cell rubber-like material disposed within the cavity formed by said curvature, said remaining portion of said one external surface extending in a plane and contacting at least a portion of the surface of said rubber-like material, said remaining portion of said one external surface defining marginal edges, wherein said marginal edges of said remaining portions are directed towards each other and residing in said plane and means to secure said sheet to the side walls of a boat.

4,123,813
BUOYANT FLOAT AND FLAG ASSEMBLY
Ronald J. Adams, 12311 Kent Ct., Southgate, Mich. 48195
Filed Jan. 24, 1977, Ser. No. 761,629
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—8 R 10 Claims

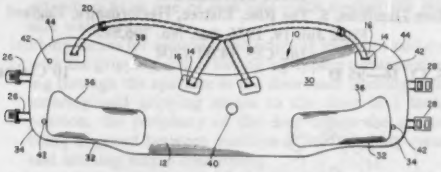


1. A flotation device, comprising:
(a) an elongated staff,
(b) an annular buoyant member,
(c) means for mounting the buoyant member to the staff, comprising: (a) a cylindrical body having a recessed sidewall, a planar top wall and a planar bottom wall, the body being provided with an internal passageway having a diameter less than that of the staff such that the body is frictionally retained on the staff.
(d) a visually observable signalling device detachably mounted onto the staff at one end thereof, and
(e) means for detachably locking the visually observable signalling device onto the staff, the locking means, comprising:
(1) a biassed member secured to the visually observable device, and
(2) means for receiving the biassed member formed on the staff, the receiving means releasably retaining the biassed member upon the mounting of the device to the staff.

4,123,814
FLOTATION DEVICE
Donald N. Ettinger, Knoxville, Tenn., assignor to Ettinger Enterprises, Inc., Knoxville, Tenn.
Filed Jul. 20, 1977, Ser. No. 817,270
Int. Cl.[2] B63C *9/08*
U.S. Cl. 9—337 4 Claims

1. A flotation device comprising a body of buoyant material, said body being of a size and shape to be worn generally about a person's mid-section and entirely beneath the underarm areas of the wearer, a rib of buoyant material located adjacent to the front portion of said body when being worn, said rib protruding inwardly from and extending horizontally along the inside surface of said body of buoyant material, said rib having an

upper portion which extends along and under and in close proximity to the lower rib of the person wearing the device,



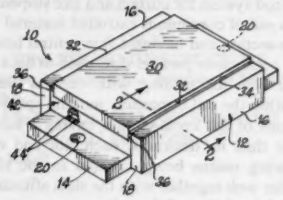
said body of buoyant material being entirely under water when the person is in the water in a generally upright position.

4,123,815

FIXED POINT ELASTOMERIC BRIDGE BEARING AND BRIDGE ASSEMBLY

Clarence H. Neff, Skokie, Ill., assignor to Felt Products Mfg. Co., Skokie, Ill.

Filed May 2, 1975, Ser. No. 574,008
Int. Cl.[2] E01D *19/06*
U.S. Cl. 14—16.1 **17 Claims**



1. A bridge bearing assembly comprising

a trough having a base and end wall means extending upwardly from said base,

a load plate supported within said trough and having end edge means spaced from and confronting said end wall means, said load plate extending vertically above said end wall means, said end wall means and said end edge means defining an elongate gap therebetween,

an elastomeric supporting bearing body positioned between said load plate and said base and supporting said load plate within said trough, said bearing body being bonded to said load plate and to said base,

said trough defining laterally open sides between said end wall means for accommodating lateral shear movement of said elastomeric supporting bearing body, and

elastomeric bearing body means bonded to said end wall means and to said load plate end edge means and filling said gap compressively to resist movement of said load plate toward said end wall means.

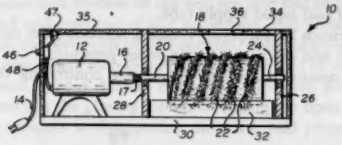
4,123,816

FINGERNAIL CLEANING APPARATUS

Peter J. Lupo, 51-35 72nd St., Woodside, N.Y. 11377

Filed Jul. 8, 1977, Ser. No. 813,966
Int. Cl.[2] A46B *13/04*
U.S. Cl. 15—21 D **7 Claims**

1. Fingernail cleaning apparatus comprising in combination a housing, an electric motor means including a drive shaft and a brush drivably connected to said drive shaft for rotation therewith located within said housing along a generally horizontal axis, a reservoir for a cleaning liquid positioned within said housing below said brush; said brush comprises a series of bristles arranged spirally about the axis of rotation, and extending radially at least in part into said reservoir; said housing means having an oval aperture dimensioned so as to permit the insertion therethrough of a person's hand for the cleaning of the fingernails thereof by contact with said brush, said aperture having a long axis extending transversely to the axis of rotation



of the brush and a short axis parallel to said brush, whereby the bristles rotate generally parallel to the fingernail.

4,123,817

WIPER BLADE AND SYSTEM

William J. Hartery, 12 Cary Ave., Lexington, Mass. 02173

Filed Aug. 8, 1977, Ser. No. 822,535
Int. Cl.[2] B60S *1/46*
U.S. Cl. 15—250.04 **8 Claims**

1. A wiper blade of elastic material for cleaning of vehicle windshields which comprises:

(a) a hollow elongated elastic material body,

(b) a flexible contact member downwardly extending from said body,

(c) a flexible elongated spline member comprising an elongated generally rectangular upper member and at least one flexible arm member extending downwardly from said rectangular upper member, said rectangular upper member adapted to accept claw means associated with a windshield wiper arm and said spline member internal to and partially filling a fluid passageway in said hollow elongated elastic material body to cooperatively form and maintain said fluid passageway open for flow of fluid therethrough.

4,123,818

CARPET AND FLOOR WASHING ACCESSORY FOR WET PICK-UP-VACUUM CLEANERS

Mathew Hurwitz, 63 Oakland Ave., Auburndale, Mass. 02166

Filed Oct. 7, 1976, Ser. No. 730,314
Int. Cl.[2] A47L *5/34*
U.S. Cl. 15—321 **7 Claims**

1. A hot water extraction carpet cleaner for household use, comprising

(a) a wet pick-up vacuum cleaner including a recovery tank, a suction tool and a suction conduit connecting said tool to said recovery tank,

(b) a toroidal-shaped closed supply tank having a central well and an annular reservoir of substantial depth surrounding said well and adapted to contain the hot cleaning solution,

(c) said central well having dimensions slightly larger than the external dimensions of said recovery tank to detachably accommodate the latter therein,

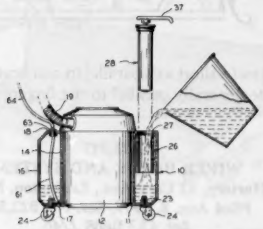
(d) a liquid supply tube having one end thereof within the interior of said reservoir below the level of the cleaning

solution and the opposite end thereof terminating in proximity to said suction tool,

(e) a discharge nozzle connected to said last-mentioned end of said liquid supply tube,

(f) means for supplying cleaning solution from said reservoir to said discharge nozzle under pressure,

(g) manually operated means for controlling the flow of



cleaning solution to said discharge nozzle at desired intermittent periods, and

(h) means associated with said suction tool and suction conduit to visibly indicate the mixture of soil and cleaning solution picked up thereby for conveyance to said recovery tank in consequence of the movement of, and application of vacuum to, said suction tool following the application of the cleaning solution to the carpet.

4,123,819

BI-DIRECTIONAL RE-ENTERING WHEEL FOR FIXED AND EXTENDIBLE TROLLEYS AND FEET

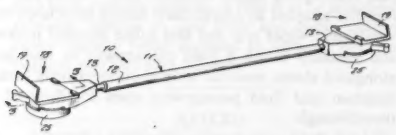
Stefano Benedetti, Rome, Italy, assignor to Leonardo Cassale, Long Island City, N.Y., a part interest

Filed Aug. 16, 1977, Ser. No. 825,054

Claims priority, application Italy, Nov. 15, 1976, 52177 A/76

Int. Cl.[2] B60B *33/08*

U.S. Cl. 16—24 **1 Claim**



1. A caster unit, comprising in combination, a spring-loaded, telescopic arm, a caster at each opposite end of said arm, each said caster including a housing having an upward plate for fitting around opposite sides of an object placed upon said caster unit, and each said caster including a spherical roller for traveling on a floor surface; said housing having a downward cylindrical wall around a central cavity receiving said roller, said cylindrical wall having four equidistant apart notches along a lower edge thereof, said roller being mounted on a center of a straight shaft, opposite ends of said shaft fitting into either pair of opposite of said notches; a bottom cap being fitted on a lower end of each said caster housing, a central opening through said cap allowing said roller to protrude downward therethrough; a collar being rotatably fitted around said cylindrical wall, a handle integral with said collar extending sidewardly, a cam face on an underside of said collar having said shaft ends rest thereagainst, said cam face being contoured so that in one pivoted position of said collar the said roller is upwardly retractable inside said cavity, in an opposite pivoted position of said collar the said roller is downwardly advanced outward of said cavity.

4,123,820

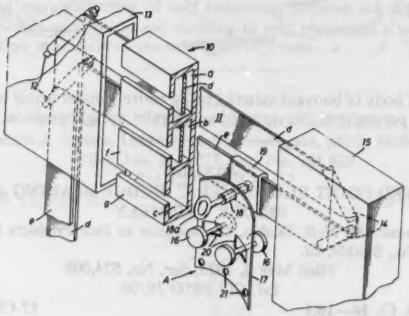
CURTAIN SUSPENSION AND DRAWING SYSTEM, AND RAIL THEREFOR

Robert Hamilton, 5, The Rise, Elstree, Herfordshire, England

Filed Jul. 19, 1976, Ser. No. 706,592

Int. Cl.[2] A47H *1/04*

U.S. Cl. 16—95 D **10 Claims**



1. A draw rod system for curtain and like suspension systems comprising a rail of continuous extruded material of generally hollow cross-section and having a thin central integral web to provide two continuous parallel slots back to back on opposite sides of said web for guiding with vertical and horizontal clearance within the rail oppositely moving spans of a flexible drawing means of flat cross-section having a height substantially greater than its thickness, each slot and its contained flexible drawing means being situated in the same vertical plane, said thin web together with the slots affording preferential horizontal flexibility of the rail transverse to the plane of the web, the outer vertical boundary surfaces of the web each forming the vertical inner wall of a respective slot, and the respective outer wall of each slot, which lies opposite to the vertical inner wall, being interrupted by an outwardly open channel extending continuously along the length thereof and of a height less than the height of said flexible drawing means, a master glider secured by a clamping and connecting means to the respective span of the flexible drawing means, said master glider clamping and connecting means cooperating slidably with the slot walls and with said outwardly open channel during the longitudinal movement of the flexible drawing means.

4,123,821

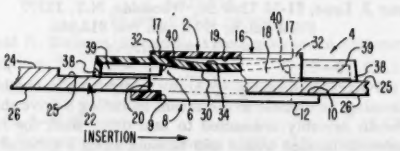
SELF LOCKING DOOR OPENING DEVICE AND ASSEMBLY

Harold B. Brown, Livonia, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 31, 1977, Ser. No. 847,398

Int. Cl.[2] A47B *95/02;* A47J *45/07;* B65D *25/28;* E05B *1/00*

U.S. Cl. 16—114 R **3 Claims**



1. An assembly for use with a door having an interior surface and an exterior surface, the door having an aperture extending therethrough the door, thereby placing the exterior surface in fluid communication with the interior surface, said assembly comprising:

gripping means for providing a gripping surface interiorly the door, said gripping surface defined by a pair of side walls; and said gripping means including extending means extending from one of said side walls toward the other side wall; and

latching means for securing said gripping means to said door with the gripping means having a gripping surface extending through the aperture in the door, said latching means securing said gripping means to the door in a locked position, the periphery of the door about the aperture being disposed between portions of said latching means, said latching means comprising

a base member connected to said gripping means, said base member having an opening extending therethrough, thereby allowing said gripping surface to be in fluid communication with the exterior surface, said base member extending substantially perpendicular to said side walls, and said base member adapted for abuttingly engaging the exterior surface of the door in said locked position; and

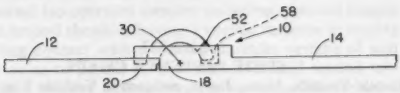
a flexible elongated clip having a pair of ends and a central portion, said gripping means being secured in said locked position when said clip is disposed in a longitudinal passageway defined by said side walls and said extending means, the periphery of the door about the aperture being disposed between the ends of said clip and said base member, the central portion of said clip flexing to abuttingly engage said extending means.

4,123,822

PINLESS HINGE STRUCTURE

Frank A. Bentley, Goshen, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Sep. 26, 1977, Ser. No. 836,883
Int. Cl.[2] E05D *1/06, 7/10*
U.S. Cl. 16—128 R **14 Claims**



1. A two-piece, pinless, hinge structure comprising:

a first member having a general four-sided opening formed therein with first and second surfaces being formed on opposed sides of said opening; and

a second member having opposed generally convex and concave surfaces thereon;

said generally convex and concave surfaces facing said first and second surfaces, respectively, when said first and second members are in assembled relationship to enable said first and second members to pivot with respect to each other.

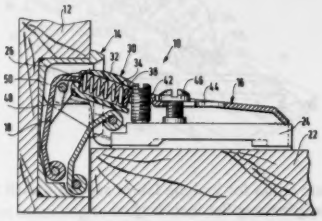
4,123,823

OVER-CENTER HINGE

Gerhard W. Lautenschläger, Brensbach, Fed. Rep. of Germany, assignor to Karl Lautenschläger KG Möbelbeschlagfabrik, Reinheim, Fed. Rep. of Germany

Filed Oct. 27, 1977, Ser. No. 845,964
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1976, 2656305
Int. Cl.[2] E05D *11/10, 3/06*
U.S. Cl. 16—145 **9 Claims**

1. An over-center hinge for cabinet doors, having two links in the manner of a quadruple joint, to be hinged at one end to a door member of the cabinet and at the other end to a wall member of the cabinet in the form of an elongated bearing arm, said hinge being movable through a dead-center position in the movement from a closed position to an open position, a resilient element for urging said hinge on the one side of said dead-center position in the closing direction, and on the other side in the opening direction, said bearing arm having a front, door-end portion, one of said links having a lever-like projection at that end thereof which is adjacent the bearing arm, said projection having a free end, said resilient element being disposed in said front, door-end portion of the bearing arm and engaging with one end said free end of said projection, said projection forming with the pivot axis of said one link, at the bearing arm end a lever arm which is so directed away from said pivot axis that it is biased by said resilient element in the closed position to a movement in the closing direction, and in the open position to a movement in the opening direction, said projection



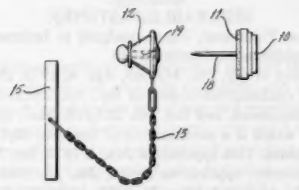
being provided on that link of said two links which is more remote from said wall member, said resilient element having at least one helical spring constructed as a compression spring, said bearing arm having an opening in its upper face, a thimble displaceable in said opening in the direction of the longitudinal extension of said bearing arm, said thimble having a hollow interior and having an open end facing the cabinet interior, said spring being disposed under bias in said hollow interior of said thimble, said spring with its extremity at the open end of said thimble engaging said upper face of said bearing arm while said thimble engages said free end of said projection.

4,123,824

TIE TACKS

Herbert B. Roberts, 219 Glen Cove Dr., Chesterfield, Mo. 63017

Filed May 9, 1977, Ser. No. 795,157
Int. Cl.[2] A41D *25/04*
U.S. Cl. 24—49 CP **1 Claim**



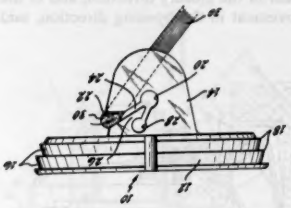
1. A tie tack wherein at least one surface adapted to be in contact with a tie is covered at least in part with a layer of non-staining depressible polymeric plastic polyurethane foam material, said layer of depressible polymeric plastic polyurethane foam material ranging in thickness from about 1/32 inch to about ¼ inch, thick enough to engage the tie when in service to prevent rotation of exposed parts of a tie tack and thin enough to avoid interference with the normal functioning of the tie tack.

4,123,825

TUFTING BUTTON WITH PLASTIC COLLET

Frederick B. Messler, Manhattan Beach, and Donald Neville, Malibu, both of Calif., assignors to Plastiglide Manufacturing Corporation, Hawthorne, Calif.

Filed Oct. 28, 1977, Ser. No. 846,516
Int. Cl.[2] A44B *1/18, 13/00*
U.S. Cl. 24—90 B **9 Claims**



1. A plastic collet for locking fabric around a shell member and with the plastic collet including

a base portion for insertion into the open end of the shell member for locking fabric around the shell member,

a hook portion extending from the base portion and with the hook portion including a generally circular eye extending through the hook portion for receiving a string member,

an elongated lead-in ramp extending from the exterior of the hook to the eye for providing a passageway for a string member,

the lead-in ramp formed with a flared intrance adjacent the exterior of the hook for providing easy access to an elongated restricted area leading into the eye and with the restricted area formed between the body of the hook portion and a lever section extending from the base portion towards the center portion of said eye terminating at an interior end and with the lever section flexible to move toward the base portion as the string is pulled through the restricted area and with the lever section snapping back to its initial position when the string is pulled into the eye and with the body of the hook portion substantially rigid to resist movement as the string is pulled through the restricted area, and

the eye of the hook including said interior end of the lever section having a configuration substantially coextensive with said eye and forming a portion thereof, at least a portion of the lever section being relieved thereby forming a reduced portion to increase the flexibility of the lever section.

4,123,826

SEPARABLE FASTENER

Akio Tanaka, Yokohama, Japan, assignor to International Fastener Establishment, Liechtenstein

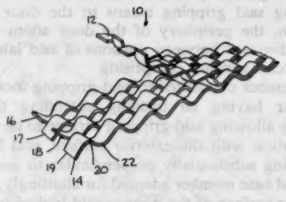
Continuation of Ser. No. 347,683, Apr. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 230,254, Feb. 29, 1972, abandoned, and Ser. No. 233,910, Mar. 13, 1972, abandoned, which is a continuation of Ser. No. 56,436, Jul. 20, 1970, abandoned. This application Jun. 3, 1975, Ser. No. 583,437
Claims priority, application Japan, Jul. 23, 1969, 44-57904; Mar. 1, 1971, 46-10264; Mar. 22, 1971, 46-16080; Feb. 4, 1972, 47-12756
Int. Cl.[2] A44G *17/00*
U.S. Cl. 24—204 **9 Claims**

1. A fastener comprising:

first and second press-on separable facing fastener portions, each of said fastener portions having a plurality of adjoining, longitudinal, undulating strips, each of said strips providing a series of spaced apart ridges,

within each of said fastener portions, adjoining ones of said strips being longitudinally staggered relative to each other, the thickness of said strips being substantially less than the height of said ridges to provide openings under said ridges,

within each of said fastener portions, a first one of said strips being laterally spaced from a third one of said strips by a second one of said strips, the lateral distance between the ridges of said first one of said strips and said third one of



said strips being substantially equal to the lateral width of said second one of said strips,

the edges of said strips of said first fastener portion interferring with and frictionally engaging the edges of said strips of said second fastener portion,

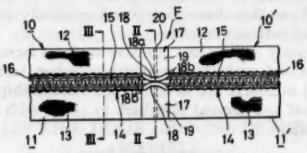
each of said fastener portions being an integral element having substantial resilience.

4,123,827

SLIDE FASTENER CHAIN

Hiroshi Yoshida, Uozu, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Jul. 27, 1977, Ser. No. 819,249
Int. Cl.[2] A44B *19/00, 19/36*
U.S. Cl. 24—205 R **10 Claims**

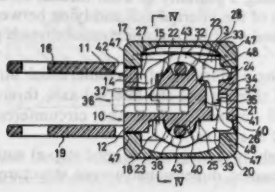


1. A slide fastener chain comprising: a multiplicity of pairs of predetermined unit length of slide fastener stringers, each stringer including a support tape and a row of interlocking fastener elements secured to an inner longitudinal edge of said tape, each of said elements having a coupling head and connecting portions, said stringers being disposed in the same plane with their respective adjoining ends confronting with each other across a gap space; and jointing means conjoining said unit length of stringers, said means comprising a thermoplastic slug generally conforming in cross-sectional profile to the contour of said fastener element and an adhesive reinforcing strip integral with said slug and extending substantially transversely of said support tape, said thermoplastic slug being arcuately shaped with its outwardly curved central periphery extending towards and substantially flush with the coupling head of said fastener element and with each of its tapered ends lying substantially in registry with the connecting portions of said fastener element.

4,123,828
AUTOMATICALLY LOCKING DUAL-TAB SLIDER FOR SLIDE FASTENERS

Shunji Akashi, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Sep. 14, 1977, Ser. No. 833,174
Claims priority, application Japan, Sep. 20, 1976, 51-126423
Int. Cl.[2] A44B *19/30*
U.S. Cl. 24—205.14 K **7 Claims**



1. An automatically locking, dual-tab slider for slide fasteners comprising:

(a) a body including first and second wings connected at their front ends by a neck so as to provide therebetween a Y-shaped guide channel;

(b) a first tab-operated member including a locking pawl, a first tongue, and a first shoulder having a curved surface in wiping abutting contact with a first shoulder surface of said body so as to permit pivotal motion of said first tab-operated member without connection thereof to the slider body, said locking pawl being movable to project into and to retract away from said guide channel in response to the pivotal motion of said first tab-operated member;

(c) first resilient means for biasing said first tab-operated member against said first wing to cause said locking pawl to normally project into said guide channel;

(d) a second tab-operated member including a second tongue and a second shoulder having a curved surfacee in wiping abutting contact with a second shoulder surface of said body so as to permit pivotal motion of said second tab-operated member without connection thereof to the slider body, said second tongue being movable into and out of engagement with said first tongue in response to the pivotal motion of said second tab-operated member;

(e) said neck provided therein with a cross-channel having first and second offset portions for receiving said first and said second tongues, respectively;

(f) a first pull tab operatively connected to said first tab-operated member for retracting said locking pawl away from said guide channel against the bias of said resilient means when said first pull tab is pulled; and

(g) a second pull tab operatively connected to said second tab-operated member for pivotally moving the same, when said second pull tab is pulled, and thus permitting said second tongue to be into engagement with said first tongue, so as to pivotally move said first tab-operated member against the bias of said first resilient means, whereby said locking pawl is retracted away from said guide channel.

4,123,829
LOCKABLE SLIDERS

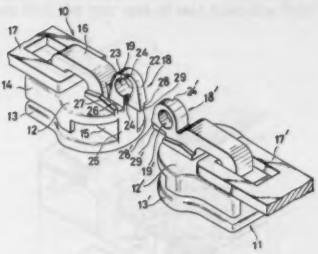
Hideo Takabatake, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Aug. 25, 1977, Ser. No. 827,606
Claims priority, application Japan, Sep. 2, 1976, 51-117869[U]
Int. Cl.[2] A44B *19/26, 19/00*
U.S. Cl. 24—205 R **5 Claims**

1. A slider for a slide fastener which slider is disposed to be locked together with an oppositely facing similar slider on the same slider fastener, which slider comprises:

(a) a body having a pair of wings connected to each other at corresponding ends by a neck to define a Y-shaped guide channel therebetween for passage therethrough of fastener element rows of the slide fastener;

(b) a link carried by one of said wings and having an eye extending transversely through the link to accommodate the insertion of a locking means, said link extending beyond the end of said slider and generally parallel to the longitudinal axis of said slider, said link having on one side

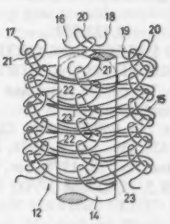


a ledge extending radially of said eye generally perpendicular to said one wing, said ledge being positioned for abutment with the ledge of said similar slider to position the eyes of both sliders in alignment to receive through both eyes said locking means and to prevent pivotal movement of said sliders relative to each other when locked together by said locking means received through said both eyes.

4,123,830
SLIDE FASTENER STRINGER

Yoshio Matsuda, Nyuzen, and Ryuichi Murasaki, Toyama, both of Japan, assignors to Yoshida Kogyo K.K., Japan

Filed Aug. 22, 1977, Ser. No. 826,305
Claims priority, application Japan, Sep. 2, 1976, 51-117870[U]
Int. Cl.[2] A44B *19/00*
U.S. Cl. 24—205.16 R **5 Claims**

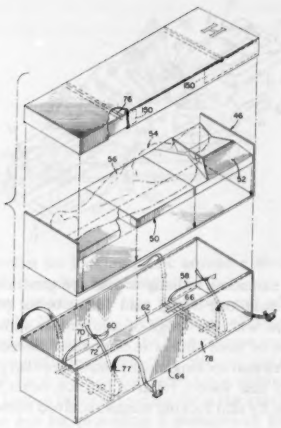


1. A slide fastener stringer comprising a stringer tape having a reinforcing cord on and along its one edge, and a series of fastener elements mounted on and along said reinforcing cord, said reinforcing cord including a central core and a warp-knitted tube surrounding said central core and extending longitudinally therewith, said warp-knitted tube including a plurality of knitting threads each having respective needle loops alternately circumferentially spaced around said central core and sinker loops extending circumferentially across and over a peripheral area of said central core and between said circumferentially spaced needle loops, said needle loops of one of the knitting threads being interlooped with those of another knitting thread, the peripheral areas of said central core on which the sinker loops of said interlooped knitting threads are disposed having respective portions circumferentially oppositely spaced from each other, whereby said needle and sinker loops are urged into fastening engagement with said central core.

4,123,831
LIGHTWEIGHT, DISPOSABLE TRANSPORTATION CASKET

William P. Covington, Burnsville, Minn., assignor to National Car Rental System, Inc., Minneapolis, Minn.

Filed Feb. 11, 1977, Ser. No. 767,824
Int. Cl.[2] A61G *17/00*
U.S. Cl. 27—2 10 Claims

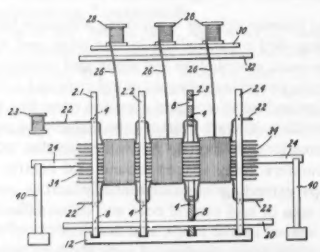


1. A transportation casket comprising:
a shell section;
a linear section located within said shell section;
a plurality of mattress sections located within said shell section on said liner;
a headrest on one of said mattress sections;
first securing means for securing remains within said shell section;
a cover for covering said shell section; and
second securing means for securing said cover to said shell.

4,123,832
METHOD AND DEVICE FOR ORTHOGONALLY WOVEN REINFORCING STRUCTURE

Frederick E. Schultz, Devon, Pa., assignor to General Electric Company, Philadelphia, Pa.

Continuation of Ser. No. 660,527, Feb. 23, 1976, which is a division of Ser. No. 430,758, Jan. 4, 1974, Pat. No. 3,993,817.
This application Jan. 19, 1978, Ser. No. 870,965
Int. Cl.[2] B32B *5/12;* D06M *17/00;* B65H *81/00*
U.S. Cl. 28—143 11 Claims



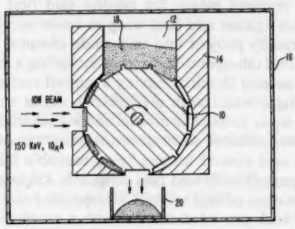
1. A method for forming a predetermined dimensional woven structure having threads in an axial direction, threads in a radial direction and threads in a circumferential direction, comprising the steps of:

(a) providing a core having an internal axis;
(b) forming a plurality of radial threads extending initially in the direction of the internal axis and spaced therefrom at a distance greater than the maximum desired radius of the predetermined dimensional woven structure;
(c) wrapping a plurality of circumferential threads around the radial threads and the core to draw the radial threads down partly substantially normal to the internal axis and partly extending in the direction of the internal axis;
(d) interposing a plurality of axial threads extending in the direction of the internal axis and lying between the radial threads and over the circumferential threads positioned in step (c);
(e) wrapping a plurality of circumferential threads around the axial threads and the internal axis, thereby drawing the axial threads against the circumferential threads wrapped in step (c);
(f) alternately repeating step (d) and step e) until the desired predetermined dimensional woven structure is obtained; and
(g) impregnating the formed structure with a substance for retaining the threads in position.

4,123,833
METHOD OF PRODUCING DOPED TUNGSTEN FILAMENTS BY ION-IMPLANTATION

Wolfgang J. Choyke, Pittsburgh, Pa., and Roland Stickler, Ternitz, Austria, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 13, 1977, Ser. No. 841,774
Int. Cl.[2] H01K *3/02*
U.S. Cl. 29—25.18 3 Claims

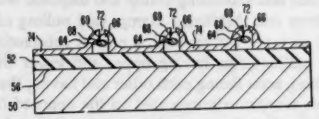


1. The method of preparing incandescible tungsten filaments which are doped with a predetermined concentration of selected dopant in order to provide said filaments with predetermined operating characteristics, which method comprises:
(a) preparing a fine powder of tungsten metal;
(b) impinging a beam of high velocity ions of said selected dopant as desired in said filaments against a target comprising a thin layer of said tungsten powder in order to implant said dopant ions in said tungsten powder target layer, and continuing said implantation until a predetermined concentration of said dopant ions is implanted in said tungsten powder target;
(c) pressing said non-implanted powder into a self-sustaining compact;
(d) sintering said compact by heating same in a non-oxidizing atmosphere at a predetermined temperature and for a predetermined time to form therefrom a sintered ingot having sufficient density to enable it to be mechanically worked into elongated form without fracture;
(e) mechanically working said sintered ingot into greatly elongated filamentary wire having a diameter as desired for said filaments;
(f) forming said elongated filamentary wire into a coiled configuration as desired for incandescible filaments; and
(g) heating said filaments to a condition of incandescence to cause same to recrystallize and form an interlocking non-sag crystal structure.

4,123,834
OVERLAPPING ELECTRODE STRUCTURE FOR SOLID STATE DEVICES

Nathan Bluzer, Silver Spring, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 14, 1977, Ser. No. 806,401
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—578 9 Claims



1. A method for providing an overlapping electrode structure to minimize the effective electrical gap between adjacent electrodes on an insulation layer of a charge coupled device, said method comprising:

forming a layer of conducting material on a surface of the insulation layer of the charge coupled device;

etching selected portions of the conducting material to form a plurality of channels in said conducting material which separate a plurality of unetched portins of conducting material on the surface of said insulating material, said etching including forming sidewalls adjacent each formed channel from the edge surfaces of the remaining unetched portions of said conducting material;

oxidizing the plurality of remaining unetched portions of the conducting material to form insulating blankets on their surfaces surrounding and electrically isolating conducting ribbons of unoxidized portions of the unetched conducting material;

opening a contact window in the insulating blankets of one of the sidewalls of each of said unetched portions of the conducting material to expose the unoxidized portion of the conducting material of said unetched portions;

providing conducting material over the exposed areas of the insulation material surface of each channel and over a portion of said sidewalls adjacent each channel to render an electrical contact of each conducting ribbon exposed through said contact window with the conducting material in the channel adjacent therewith to form adjacent electrodes across the surface of the insulation layer, the effective electrical gap between adjacent electrodes being substantially equivalent to the thickness of the insulation blanket that covers the conducting ribbons.

4,123,835
METHOD FOR ASSEMBLING A FUEL PUMP TO AN INTERNAL COMBUSTION ENGINE

Yoshiharu Itoh, Kariya; Makoto Iwatsuki, Okazaki; Kazuhiro Suzuki, Gamagori, and Tatuya Seko, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jun. 24, 1977, Ser. No. 809,650
Claims priority, application Japan, Aug. 6, 1976, 51-105754[U]
Int. Cl.[2] B23P *15/00*
U.S. Cl. 29—156.4 R 1 Claim

1. A method for assembling a driving gear to a coupling block in a fuel pump for an internal combustion engine comprising;

a pump housing having a pump element for delivering fuel under pressure to the engine and also having a cam shaft for actuating said pump element, one end of said cam shaft protruding outside of said pump housing;

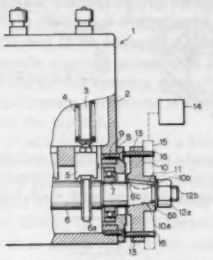
a coupling block fixedly secured to the protruded end of said cam shaft, said coupling block being formed with at least two axially extending threaded holes; and

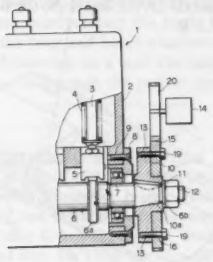
a driving gear coupled to said coupling block and for engaging a ring gear of the engine, said driving gear being formed with at least two through holes,

said method comprising the steps of:

screwing a head-less bolt into one of said threaded holes of the coupling block till the front end thereof abut on said pump housing to thereby hold said coupling block at its proper position;

mounting said driving gear to said coupling block in such a manner that the rear end of said head-less bolt is inserted





into one of said through holes and at the same time said driving gear is engaged with a ring gear of the engine;

fixing said driving gear to said coupling block by means of a fixing bolt by screwing said fixing bolt through the other of said through hole into the other of said threaded hole; and

taking off said head-less bolt from said threaded hole to release the locking between said coupling block and said pump housing.

4,123,836
MACHINE HAVING FLUID PASSAGES

Raymond A. Buckell, Maidenhead, England, assignor to Buckell Engineering Company, Limited, Berkshire, England

Continuation of Ser. No. 452,842, Mar. 20, 1974, abandoned.
This application Aug. 16, 1976, Ser. No. 714,511
Claims priority, application United Kingdom, Mar. 23, 1973, 14142/73
Int. Cl.[2] B23P *15/00*
U.S. Cl. 29—156.4 WL 1 Claim

1. A method of making a machine comprising the steps of:

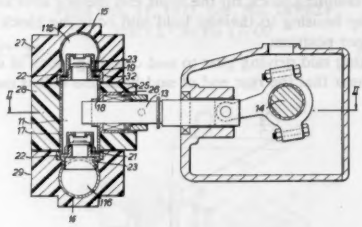
non-fixedly mating together first and second components so as to define therebetween a passage for the flow of fluid within said machine, each of said components having an internal surface constituting a wall of said passage;

disposing said non-fixed mated componets within a mold;

molding a casing about substantially the entire external surface area of said components so as to fixedly secure said components together, the casing thickness being substantially greater than the wall thickness of the components,

whereby said components are fixedly secured together solely by said molded casing so as to define said fluid

passage solely by said components and not by the material of said molded casing, and whereby all of the components walls are reinforced by the casing material wherein a



number of part-casings are made and the part-casings are secured together to hold the components in each in passage-defining relationship with each other.

4,123,837

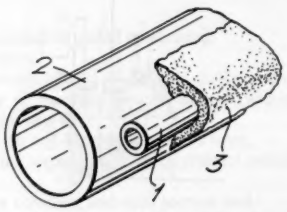
HEAT TRANSFER METHOD

Ian M. Horner, Southampton, England, assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 12, 1976, Ser. No. 657,571

Int. Cl.[2] B21D *53/00;* **B21K** *29/00;* **B23P** *15/26*

U.S. Cl. 29—157.3 R **5 Claims**



1. An improved method of enhancing heat transfer between a heating or cooling element and a conduit or vessel comprising the steps of: emplacing heat transfer cement material in a mouldable state between and in contact with the element and at least an adjacent surface of the conduit or vessel and around and in contact with the element so that the element is surrounded by said heat transfer cement material which contacts the element, applying a relatively rigid recessed continuous retaining member around the heat transfer cement material so that edges of the retaining member substantially abut the conduit or vessel whereby coherence takes place between said conduit or vessel, said heating or cooling element and said retaining member, and said number maintains said coherence and slight compression of the heat transfer cement material enclosed in the volume defined between the retaining member and the conduit or vessel and securing the retaining member and conduit or vessel relative to each other to maintain said coherence and slight compression.

4,123,838

PLUMBER'S HANDLE PULLING TOOL

Carl A. Magavero, County Line Rd., Forestville, N.Y. 14062

Continuation-in-part of Ser. No. 711,127, Aug. 3, 1976, abandoned. This application Oct. 17, 1977, Ser. No. 843,142

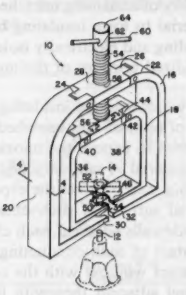
Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—261 **1 Claim**

1. A plumber's tool for pulling valve handles from valve stems comprising,

an outer stabilizing clamp including an outer bar element having a threaded aperture formed therein extending generally perpendicularly to the longitudinal axis of each outer bar and a pair of substantially "C" shaped stabilizing arms having upper and lower free ends, said stablizing arms facing each other and having their upper ends respectively mounted on the opposed free ends of said outer bar element and their lower free ends spaced from each other to engage opposite sides of a valve stem; at least one of said stabilizing arms being pivotally connected at its upper free end to said outer bar element;

an inner handle pulling clamp of smaller peripheral configuration than said stabilizing clamp and disposed within and offset from said stabilizing clamp; said pulling clamp including an inner bar element, a pair of substantially "C" shaped pulling arms having upper and lower free ends, said pulling arms facing each other and having their upper free ends respectively mounted on the opposed free ends of said inner bar element and their lower free ends located above the lower free ends of said stabilizing arms in spaced relation to each other to engage the lower surface of said valve handle; at least one of said pulling arms being pivotally connected at its upper free end to said inner bar element, said inner and outer bar elements and said stabilizing and pulling arms all lying in a common plane in planar alignment with each other to provide a compact clamp structure with said lower ends of the clamping arms being spaced above the lower ends of the stabilizing arms whereby all said lower ends may be positioned between a valve base and handle with the lower ends of the stabilizing arms engaging the base and the lower ends of the clamping arms engaging the handle;



said lower free ends of said stabilizing arms each having a semi-circular indentation formed therein for partially circumscribing a valve stem when placed adjacent thereto and flat lower surfaces to form a bearing surface providing stable support for the device when in use;

said lower free ends of said pulling arms each having a semi-circular indentation formed therein for engaging the lower portion of said valve handle and flat surfaces to form a bearing surface engaging the lower surface of said valve handle

said lower free ends of said stabilizing and pulling arms each being tapered towards their extreme free ends to permit insertion of said lower free ends between the valve handle and base;

a threaded rod rotatably secured on a first free end thereof to said inner bar element, said threaded rod passing through and threadably copperating with said threaded aperture of said outer bar element, whereby the rotation of said threaded rod draws said inner bar element toward said outer bar element and thereby effects the removal of said valve handle from said valve stem;

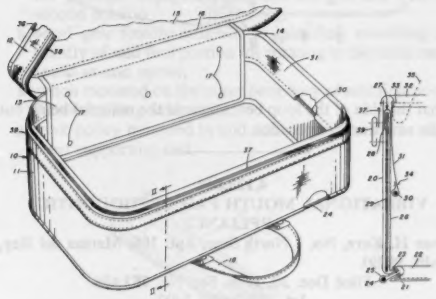
said first free end of said threaded rod including a ball swivel, and said inner bar element having an aperture formed therein adapted to capture and rotatably engage said ball swivel; and a handle fixedly secured to the second free end of said threaded rod.

4,123,839

METHOD OF MAKING A LUGGAGE CASE

Jay H. Weiner, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.

Division of Ser. No. 657,956, Feb. 13, 1976, Pat. No. 4,055,239.
This application Jul. 26, 1977, Ser. No. 819,170
Int. Cl.[2] B23P *19/00*
U.S. Cl. 29—434 3 Claims



1. A method for making a luggage case of the lightweight semi-rigid type, comprising the steps of:

(a) providing a substantially rectangular main body portion having a first support wire loop of spring steel embodied therein,

(b) providing a substantially rectangular cover portion having a second support wire loop of spring steel embodied therein,

(c) securing a peripheral flap member along one edge to the inner edge of said main body portion,

(d) securing a third support wire loop of spring steel along the unsecured edge of the flap member, and

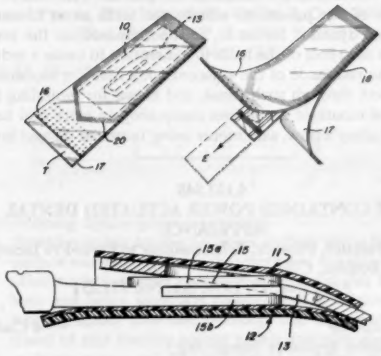
(e) assembling the cover portion with said main body portion and swinging the flap member to a position interiorly of the main body portion wherein the third support wire loop on said flap member assumes a position intervening in parallel spaced relation between said first and said second support wire loops.

4,123,840

PACKAGE FOR BLADES OR THE LIKE AND A METHOD OF ATTACHING SAME TO THE END OF A HANDLE

David O. Rumer, Jr., Rockford, Ill., assignor to Richard-Allan Medical Industries, Inc., Richland, Mich.

Filed May 2, 1977, Ser. No. 792,670
Int. Cl.[2] B23P *11/02;* B65D *83/10*
U.S. Cl. 29—453 7 Claims



1. A package comprising an elongated bottom panel; and elongated top panel overlying same, said top panel having elongated opposite side peripheral portions and one end peripheral portion attached to said bottom panel and coacting therewith to form an elongated pocket, an opposite end peripheral portion of said top panel having a segment thereof unattached and forming an opening to said pocket, said panels being formed of flexible sheet material, said opening being spaced inwardly from a peripheral end of said bottom panel; and a thin elongated replaceable element slidably positioned with said pocket, said element having an attachment end portion disposed within the pocket and adjacent said pocket opening and being adapted to be engaged by and connected to a complemental handle segment subsequent to the latter being inserted through the pocket opening upon distorting of at least one of the pocket-forming panels and while the entire element is enclosed within the pocket.

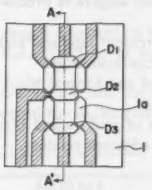
7. A method of attaching a tang of a handle to the attachment end of a thin resiliently flexible surgical blade while the latter is completely disposed within a pocket formed between a flexible elongated top panel and a flexible elongated bottom panel, the pocket having an opening thereto formed adjacent to but spaced from an end of the bottom panel, the attachment end of the blade being disposed within the pocket adjacent the pocket opening; said method comprising inserting the tang into the pocket and between the blade and one of the panels, sliding the tang into engagement with the attachment end of blade while the blade and attachment end are completely enclosed within the pocket, manipulating the blade and tang to effect interlocking of the tang and blade attachment end within the pocket and withdrawing as a unit the tang with the blade attached thereto out through the pocket opening.

4,123,841

ELECTROCHROMIC DISPLAY DEVICE MANUFACTURE METHOD

Kozo Yano, Tenri; Yasuhiko Inami, Nishinomiya; Hiroshi Hamada, Tenri, and Hisashi Uede, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 28, 1976, Ser. No. 727,448
Claims priority, application Japan, Sep. 29, 1975, 50/118104
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—570 8 Claims



1. An electrochromic display device manufacture method comprising the steps of:

preparing a first substrate and a second substrate, at least one of said substrates being transparent;

applying a first electrode on said first substrate and a second electrode on said second substrate, at least one of said electrodes being transparent and being applied on a transparent said substrate and said second electrode serving as a counter electrode;

applying a layer of transition metal oxide material on said first electrode;

initially applying said first electrode and said transition metal oxide layer successively on said first substrate over an area greater than that necessary to define a required display segment and external circuit conection pattern thereon;

forming a mask defining said required pattern on said transition metal oxide layer;

applying at least one layer of insulatory material which

covers those portions of said transition metal oxide layer which are unrequired for display purposes;

successively etching said transition metal oxide layer and said first electrode through said mask, thereby producing said required pattern in said transition metal oxide layer and said first electrode;

positioning said first substrate assembly and said second substrate assembly in an electrode facing relationship and joining said assemblies by spacer means; and

introducing electrolyte into the space defined between said assemblies and said spacer means, said elecrolyte being retained in said space.

4,123,842

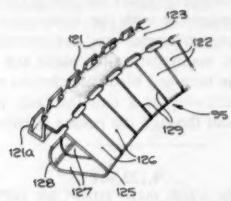
METHOD OF MAKING FREQUENCY SHIELDING MEANS FOR AN ELECTRICAL CONNECTOR

Earl A. Cooper, Los Angeles, Calif., assignor to Automation Industries, Inc., Los Angeles, Calif.

Division of Ser. No. 708,476, Jul. 26, 1976, abandoned. This application Sep. 6, 1977, Ser. No. 830,818

Int. Cl.[2] H01S *4/00*

U.S. Cl. 29—592 R **9 Claims**



1. In a method of forming a frequency interference shield means for use in an electrical connector, the steps of:

providing a rectangular blank of conductive metal stock material;

inscribing a selected pattern of securement tabs and fingers on one surface of the metal blank;

chemically etching the material between said tabs and said fingers to provide fingers of precise dimensioned tapered shape;

forming said securement tabs and said fingers into selected cross sectional configurations;

turning said etched and formed blank about an axis to provide an annulus;

and securing ends of said etched blank together with said fingers in close adjacent relation.

4,123,843

SPRING TYPE GUIDE BAR STOP FOR PORTABLE POWER CHAIN SAW

Peter Bauer, Winnenden; Guenter Dietzsch, Fellbach; Goetz Landwehr, Berglen, and Gotthilf Schulin, Fellbach, all of Fed. Rep. of Germany, assignors to Firma Andreas Stihl, Waiblingen, Fed. Rep. of Germany

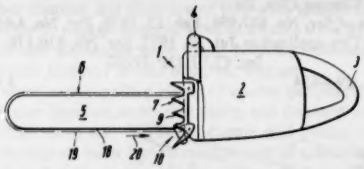
Filed Jul. 18, 1977, Ser. No. 816,875

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1976, 2632359

Int. Cl.[2] B27B *17/02*

U.S. Cl. 30—383 **16 Claims**

1. In a portable power chain saw including a chain guide bar projecting from the saw housing and a guide bar stop assembly arranged to bear at least in part against an object being cut during operation of the saw, the improvement comprising a spring stop means associated with the guide bar stop assembly for resiliently stopping motion of the housing in the direction of the guide bar during operation of the saw, said spring stop means comprising a leaf spring coiled into a loop and arranged



so that the side of the loop bears against the material being cut by the saw during operation.

4,123,844

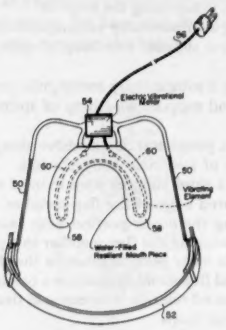
VIBRATIONAL MOUTH PAD ORTHODONTIC APPLIANCE

Craven H. Kurz, No. 1 North Star, Apt. 106, Marina del Rey, Calif. 90291

Filed Dec. 20, 1976, Ser. No. 752,404

Int. Cl.[2] A61C *7/00*

U.S. Cl. 32—14 D **2 Claims**



1. An orthodontic appliance comprising: a plurality of brackets affixed to the teeth of the patient and an arch wire connected to said brackets to cause the roots of the teeth to exert a predetermined static pressure on the adjacent bony tissue; a pad adapted to fit into the mouth of the patient to be clenched between the teeth of the patient; means comprising an electric vibrational motor and a vibrational element mechanically coupled to the motor and extending into said pad for creating vibrational movement in the pad for transmission to the teeth of the patient to vibrate the teeth so as to cause vibrational dynamic forces to be superimposed on the static forces on the roots of the teeth in a direction to cause a reduction in the resistance of the adjacent bony tissue to movement of the teeth through such tissue; and means for mounting the pad in the mouth of the patient comprising an extra oral head gear including a bow, said motor being mounted on said bow.

4,123,845

SELF CONTAINED POWER ACTUATED DENTAL APPLIANCE

John B. Fattaleh, Phoenix, Ariz., assignor to Porta-Pro Incorporated, Boulder, Colo.

Filed Dec. 17, 1976, Ser. No. 751,251

Int. Cl.[2] A61C *3/06*

U.S. Cl. 32—59 **4 Claims**

1. A dental appliance comprising:

an elongated hollow housing extending from a hand gripping, first end to an implement supporting end,

said housing comprising a first portion adjacent its first end and a second portion detachably mounted in axial alignment therewith comprising the implement supporting end,

power means mounted within said first portion to provide a balanced handle for said tool having an optimum weight distribution,

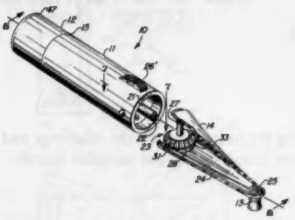
said power means comprising a direct current motor and a battery for energization thereof,

said motor having a shaft extending axially of said housing at the point of engagement of said first portion with said second portion,

a bevel gear fixedly attached to said shaft extending outwardly of said first portion for rotating at the same rate of speed as said motor,

a switch mounted on the outer periphery of said first portion for controlling said motor,

a drive pulley mounted in said second portion at the implement supporting end,



a gear reduction drive mounted within said second portion and connectable with said bevel gear of said first portion and said drive pulley in said second portion when the first and second portions are interconnected,

said gear reduction drive comprising a wheel perpendicularly mounted to the axis of said shaft within said second portion and having a set of gear teeth around its periphery for engaging with said bevel gear,

an implement mounting means provided adjacent said implement supporting end for engaging and being driven by said drive pulley, and

a drive belt within said second portion for connecting said drive pulley to said gear reduction means,

said first portion of said housing comprising a compartment for containing a battery charging means at said first end of said housing in axial alignment with a battery and said direct current motor forming said power means,

said charging means comprising one coil of an electric power rectifying means.

4,123,846

FRAMING SQUARE GUIDE

Manuel Parras, 2516 Damuth St., Oakland, Calif. 94602

Filed May 3, 1977, Ser. No. 793,239

Int. Cl.[2] B43L *13/04*

U.S. Cl. 33—112 **7 Claims**

1. Framing square guide comprising:

a. slotted member having an upper surface and a flat lower surface and having a slot therebetween opening into another surface of said slotted member, said slot having a base and being sized for reception of a portion of the framing square into said opening, said base limiting the travel of said framing square within said slot; and

b. a fence connected to said slotted member, and being substantially perpendicular to and extending above said upper surface, said fence including an outer surface, said lower surface of said slotted member being substantially perpendicular to said outer surface of said fence, said slot lying substantially in a plane angularly disposed to intersect a plane defined by said lower surface of said slotted member and said base having a longitudinal axis which extends parallel to said outer surface.

4,123,847

APPARATUS FOR MEASURING INTERNAL CORROSION IN PIPELINES

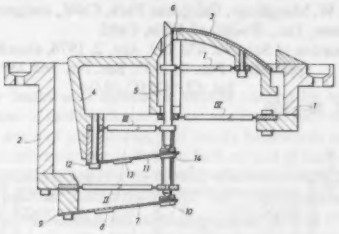
Hendrik Bosselaar, and Frank Oltmans, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 13, 1977, Ser. No. 841,631

Claims priority, application Netherlands, Oct. 22, 1976, 7611703

Int. Cl.[2] G01B *7/12, 7/34*

U.S. Cl. 33—178 E **3 Claims**



1. An apparatus for measuring both the average internal diameter of a pipeline and the depth of the individual pits, said apparatus comprising:

a pipeline pig having at least one open section;

a plurality of pairs of probes disposed around the periphery of said open section, each pair of probes having a shoe-shaped probe and a pointed-end probe disposed to project through an opening in the pipeline contacting surface of the shoe-shaped probe;

a plurality of flat spring members disposed to support said probes both with respect to each other and said open section, said probes moving relative to each other in a radial direction;

a plurality of strain gauges mounted on said flat spring members to measure the deflection of said spring members; and,

a recording means carried by said pig and coupled to said strain gauges to record the deflection of said spring members.

4,123,848

BLOCK PROFILE GAUGE

Kenneth C. Emmerich, Lexington, and David L. Hunter, Versailles, both of Ky., assignors to Fansteel Inc., North Chicago, Ill.

Filed May 31, 1977, Ser. No. 801,764

Int. Cl.[2] B27G *23/00*

U.S. Cl. 33—185 R **7 Claims**

1. A profile gauge for power driven, block mounted mining tools which comprises:

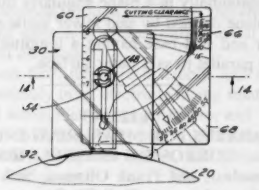
(a) a first plate carrying a silhouette of a tool having a tip end to be gauged,

(b) first means mounting said plate for a lineal height adjustment,

(c) second means mounting said plate for rotation around the tip end of the tool silhouette to be gauged,

(d) third means carrying indicia to indicate the relative position of said plate relative to said first and second mounting means,

(e) said second means comprising an assembly of a pair of plates separated by a spacer to provide a slot opening, and



(f) pivot means to engage said assembly and said first plate to pivot said plate around the tip end of the tool silhouette.

4,123,849

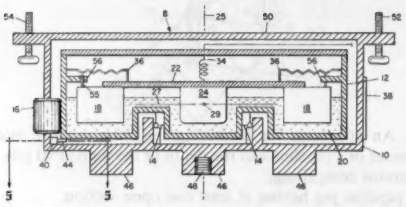
MINIATURE NORTH REFERENCE UNIT

Robert W. Maughmer, Calabasas Park, Calif., assignor to Litton Systems, Inc., Woodland Hills, Calif.

Continuation of Ser. No. 673,109, Apr. 2, 1976, abandoned. This application Feb. 3, 1977, Ser. No. 765,239

Int. Cl.[2] G01C *19/34*

U.S. Cl. 33—320 **33 Claims**



1. An instrument for providing a signal from which the direction of true month may be determined, said instrument comprising:

a frame;

means for sensing the rate of angular motion of the earth about a sensitive axis and for providing an output signal representative of said earth rate;

means for supporting said sensing means on said frame with a sensitive axis of said sensing means rigidly constrained from any rotation with respect to said frame in any one substantially horizontal first direction, said supporting means including means for isolating said sensing means from small rotations about any horizontal axis of said frame relative to the earth's surface;

said output signal being indicative of the angle between said first direction and true north; and

means for establishing a reference horizontal direction with respect to said first direction of the sensitive axis of said sensing means.

4,123,850

APPARATUS FOR PYROPROCESSING AND COOLING PARTICLES

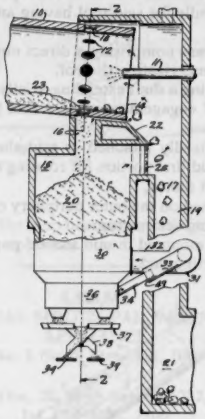
Lee H. Niems, 2702 Brassie, Flossmoor, Ill. 60422

Filed May 23, 1977, Ser. No. 799,221

Int. Cl.[2] F26B *7/00*; F27D *15/00*

U.S. Cl. 34—20 **13 Claims**

13. The method of cooling particulate material pyro-processed through a kiln comprising passing particles larger than a predetermined size out the end of the kiln, discharging particles of said predetermined size and less through circumferentially spaced openings of said predetermined size in the wall of the kiln, accumulating said discharged pyroprocessed particles directly in the cooling bed of a shaft cooler and withdrawing particles from said bed which are cooled therein, passing cooling air directly up through said bed to cool said particles whereby said air is heated by the heat of said particles and then



introducing the heated air into the discharge end of the kiln for combustion processing of the particles therein.

4,123,851

CLOTHES DRIER

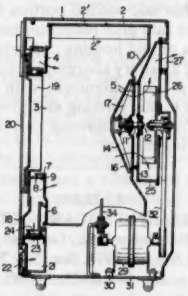
Kinya Itoh; Shigeaki Tanaka, both of Hitachi; Gen Shimizu, Mito, and Yuzi Suganuma, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation of Ser. No. 653,102, Jan. 28, 1976, abandoned. This application Jul. 13, 1977, Ser. No. 815,434

Claims priority, application Japan, Jul. 18, 1975, 50-88018; Jul. 18, 1975, 50-88019

Int. Cl.[2] F26B *11/04*

U.S. Cl. 34—48 **8 Claims**



1. A clothes drier comprising:

an outer frame having a first opening formed in a front wall thereof;

a door mounted on said outer frame for sealing said first opening;

a drum rotatably supported about a substantially horizontal axis of rotation extending within said outer frame, said drum including a second opening through which clothes are charged into and taken out of said drum, an air intake portion, and an air exhaust portion;

a lint filter removably mounted inside the rear wall of said drum to collect lint given off by the clothes;

an electric blower disposed between the rear wall of said drum and said outer frame for introducing air through said

air intake portion into said drum and for exhausting the air through said exhaust portion out of said drum;

air adjusting means disposed in the front wall of said outer frame for controlling the flow rate of air introduced into said drum; and

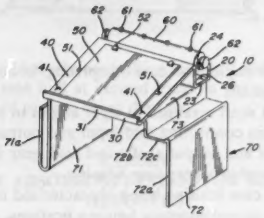
heat generating means positioned between said air intake portion of said drum and said air adjusting means for heating air introduced through said air adjusting means, said heat generating means including positive temperature coefficient thermistors whereby the temperature of said heat generating means and that of the exhaust air can be adjusted without requiring thermostats for preventing overheating of said heat generating means and the clothes in said drum.

4,123,852

TEACHING DEVICE

Vera Zimowski, R.D. #1, Ashville, N.Y. 14710

Filed Apr. 7, 1977, Ser. No. 785,413
Int. Cl.[2] G09B *1/20*
U.S. Cl. 35—62 **3 Claims**



1. A teaching device comprising:

(A) a frame having first and second ends;

(B) an exposed information conveying roll

(1) disposed adjacent said firstend of said frame transversely thereof and

(2) bearing raised indicia thereon;

(C) an information receiving work surface

(1) disposed on said frame between said information conveying roll and said second end of said frame and

(2) covering substantially all of the surface area thereof;

(D) a support member having

(1) opposed legs with top and bottom edges, and

(2) a top transverse support element interconnecting the top edges of said legs;

(E) said frame being freely received on said support element; and

(F) engagement means carried by the bottom surface of said frame and the top surface of said support member, whereby relative shifting there between is prevented.

4,123,853

EDUCATIONAL DEVICE FOR DYSLEXIC CHILDREN

Janis A. Dickensheet, 3313 E. Seminole, Springfield, Mo. 65804

Filed Apr. 27, 1977, Ser. No. 791,357
Int. Cl.[2] G09B *1/20*
U.S. Cl. 35—77 **7 Claims**

1. An educational device for dyslexic children, said device comprising:

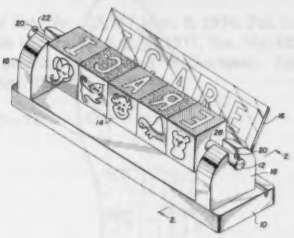
(a) a base;

(b) a shaft mounted on said base;

(c) a plurality of blocks mounted on said shaft for rotation relative to said base;

(d) a mirror mounted on said base facing said shaft;

(e) mirror-image alphabetic indicia carried by at least some of said blocks on at least one face of each of said at least some of said blocks in position to be directly visible to the user of said device, said indicia having a normal orientation when seen by normal children and a mirror-image orientation when seen by dyslexic children and said mirror-image indicia being the mirror-image of the form in which they are seen by non-dyslexic children, whereby said blocks can be rotated to positions in which said mirror-image indicia appear in normal orientation in said mirror, allowing the use of said device to compare the mirror-image indicia carried by said blocks with their mirror-images (that is, their normal appearance) in said mirror by simply turning the blocks so that the mirror-image indicia reflect in the mirror; and



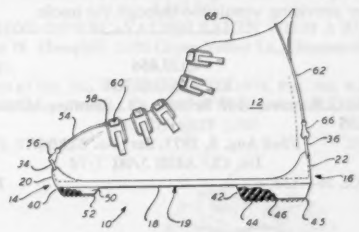
(f) totally backwards alphabetic indicia carried by said at least some of said blocks on at least one face of each of said at least some of said blocks, said totally backwards indicia and said mirror-image indicia on each of said at least some of said blocks being related so that, when the totally backwards indicium is directly visible, the corresponding mirror-image indicium is reflected in said mirror in its normal orientation, allowing the user of the device to compare directly the totally backwards indicia carried by said at least some of said blocks with their normal appearance in said mirror, since both are simultaneously visible.

4,123,854

SKI BOOT ATTACHMENT FOR FACILITATING WALKING

Daniel D. Pasich, 1501 N. Wakonda St., Flagstaff, Ariz. 86001

Filed Aug. 3, 1977, Ser. No. 821,622
Int. Cl.[2] A43B *5/00, 3/10*
U.S. Cl. 36—7.5 **11 Claims**



1. A device securable to a relatively inflexible ski boot to facilitate safe walking therein, said device comprising:

a generally elastic member adapted to receive the bottom of said ski boot, said member including a first portion for receiving the toe of said boot, a second portion for receiving the heel of said boot, and an intermediate portion extending between said first and second portions; said toe and heel portions each including a platform projecting below said intermediate portion, said platforms thereby contacting the ground during the wearer walking to support the wearer and enable movement of the wearer's foot and limbs in a manner simulative of normal walking, without requiring flexure of said boot; said platform at said heel portion being substantially thicker than said platform at said toe portion, whereby said platform at said heel

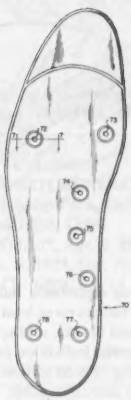
portion projects to a substantially lower point than said platform at said toe portion.

4,123,855

FLUID FILLED INSOLE

Shirley C. Thedford, P.O. Box 5052, Richardson, Tex. 75080

Filed Aug. 10, 1977, Ser. No. 823,349
Int. Cl.[2] A43B *13/40, 7/08*
U.S. Cl. 36—44 **13 Claims**



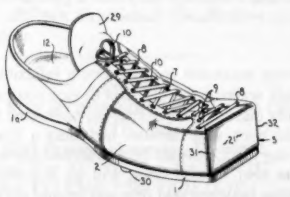
1. An insole of a shoe comprising two super-imposed sheets of flexible, fluid-impervious material, each sheet being generally in the shape of a foot and including portions to underlie the ball, longitudinal arch and heel of the foot, with a plurality of openings passing through both sheets, said sheets being sealed together along a perimeter generally near the edges of the sheets, and sealed together around said openings, to form an enclosure between said sheets capable of holding a fluid, said enclosure being at least partially filled with a relatively incompressable liquid, with a plurality of said openings being arranged along a curved line so as to form a border of said longitudinal arch portion, thereby to direct flow of said liquid with respect to the longitudinal arch portion, said openings further providing ventilation through the insole.

4,123,856

KICKING SHOE

Bobbie G. Lawson, 4845 Belinder Ct., Shawnee Mission, Kans. 66205

Filed Aug. 5, 1977, Ser. No. 822,047
Int. Cl.[2] A43B *5/00, 7/14*
U.S. Cl. 36—133 **24 Claims**



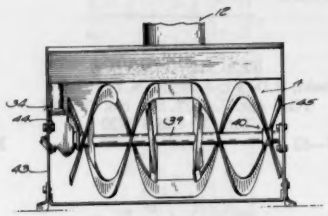
1. A kicking shoe having a ball engaging surface and wedging means therewithin maintaining the toes of a wearer of the shoe in an upwardly flexed position, thereby directing the front of the metatarsal arch toward said ball engaging surface, said wedging means including merging front and second sections shaped for supporting abuttal respectively with the bottom of the wearer's toes and said front of the wearer's metatarsal arch, said wedging means being rigid and incompressible during normal use of the shoe.

4,123,857

DRIVE ARRANGEMENT FOR SNOWBLOWER

Edward W. Enters, Fredonia, and Roger J. Bacon, Plymouth, both of Wis., assignors to Gilson Brothers Company, Plymouth, Wis.

Filed Feb. 2, 1977, Ser. No. 764,823
Int. Cl.[2] E01H *5/00*
U.S. Cl. 37—43 E **3 Claims**



1. A right angle gear case comprising, in combination,
an input shaft,
an output shaft arranged at right angles to said input shaft,
gear means connecting said input and output shafts,
said input and output shafts and said gear means being located within a gear case housing,
said gear case housing being characterized in that it is made of two complementary housing portions,
and a plurality of snap rings surrounding said housing portions to hold said housing portions assembled.

4,123,858

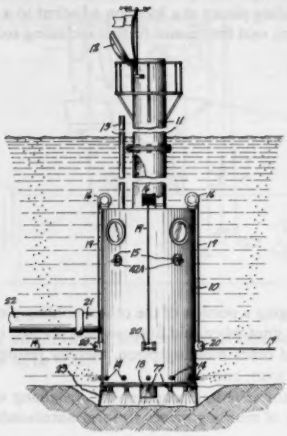
VERSATILE SUBMERSIBLE DEVICE FOR DREDGING OR OTHER UNDERWATER FUNCTIONS

George W. Batchelder, 960 E. Jackson Blvd., Elkhart, Ind. 46514

Continuation-in-part of Ser. No. 740,117, Nov. 8, 1976, abandoned, which is a continuation of Ser. No. 651,527, Jan. 22, 1976, abandoned, which is a continuation of Ser. No. 517,469, May 14, 1975, abandoned, which is a continuation of Ser. No. 469,930, Apr. 15, 1974, abandoned, which is a continuation of Ser. No. 369,925, Jun. 14, 1973, abandoned, which is a continuation of Ser. No. 161,348, Jul. 6, 1971, abandoned. This application Jul. 25, 1977, Ser. No. 818,525
Int. Cl.[2] E02F *3/88*
U.S. Cl. 37—56 **15 Claims**

1. A submersible device comprising a hollow hull having at least one watertight partition to divide the hull into an upper watertight chamber and a lower chamber adapted to receive selected amounts of water as ballast and having a bottom wall,
means in said upper chamber to generate power,
a dredge pump within the lower chamber driven by power from said generating means,
intake means connected to said pump and projecting through the bottom of the hull,
an elongated discharge conduit connected to said pump and projecting externally of said hull,
compressed air means in said upper chamber selectively controllable to discharge air under pressure into the upper part of the lower chamber and discharge water from the lower chamber to control the level of water in the lower chamber or to vent air from the lower chamber and admit water into the lower chamber, and thereby control the depth of submersion of the hull,
a plurality of members located in spaced relation transversely of said hull actuable by said generating means and

each operable to shift the position of said hull in a predetermined direction, and



means for selectively controlling said hull shifting means to position said hull at desired location and relation to the submerged surface being dredged.

4,123,859

SHOCK ABSORBING SYSTEM FOR SUCTION DREDGERS

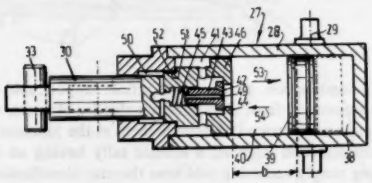
Jan de Koning, Amsterdam, Netherlands, assignor to Ballast-Nedam Groep N.V., Amstelveen, Netherlands

Filed Aug. 25, 1976, Ser. No. 717,495

Claims priority, application Netherlands, Aug. 25, 1975, 7510028

Int. Cl.² E02F *3/88*

U.S. Cl. 37—58 **7 Claims**



1. In a suction dredger having a suction pipe provided with a suction head which is adapted to be dragged along the bottom beneath a body of water, said suction head including a cutting tool pivotally mounted for movement from a cutting position to an inoperative position in response to a predetermined force exerted against the cutting tool, the improvement which comprises: piston/cylinder means for allowing said cutting tool rapidly to swing to said inoperative position upon compression thereof and slowly to return to said cutting position upon extension thereof, said means comprising a cylinder, a piston slidably received in said cylinder, and a piston rod connected to said piston and projecting from said cylinder, said piston separating the interior of said cylinder into a first fluid chamber and a second fluid chamber on opposite sides of said piston, the second fluid chamber being on the piston rod side of said piston, gas cushion means in said first chamber normally maintaining fluid pressure sufficient to extend said piston/cylinder means, passage means restricting flow of fluid from said second chamber to said first chamber to restrict the rate of extension of said piston/cylinder means, and means for by-passing said passage means to allow substantially unrestricted passage of fluid from said first chamber to said second chamber as said piston/cylinder means is compressed.

4,123,860

FLEXIBLE CONNECTIONS FOR SUCTION DREDGER PIPES

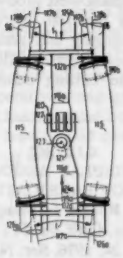
Jan De Koning, Amsterdam; Theodorus Van Den Brink, Nieuwegein, and Tjako A. Wolters, Zeist, all of Netherlands, assignors to Ballast-Nedam Groep N.V., Amstelveen, Netherlands

Division of Ser. No. 675,167, Apr. 8, 1976, Pat. No. 4,083,135. This application Aug. 8, 1977, Ser. No. 822,921

Claims priority, application Netherlands, Apr. 15, 1975, 7504493; Apr. 15, 1975, 7504489

Int. Cl.² E02F *3/90*

U.S. Cl. 37—72 **5 Claims**



1. A suction dredger comprising a pipe system for sucking up earth from a bottom beneath the water, said pipe system comprising a plurality of rigid pipe sections pivoted to one another by means of universal joints with hinge parts and communicating with one another through flexible, elastic bellows, two of said bellows being arranged side by side and one of said universal joints being disposed between the two adjacent bellows, wherein the axial directions of the two bellows ends rigidly secured to the same hinge part diverge in a direction towards the universal joint.

4,123,861

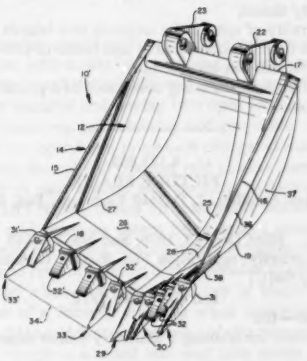
METHOD OF EXCAVATING EARTH WITH A BUCKET

Charles W. Hemphill, 1106 Green Valley La., Duncanville, Tex. 75116

Division of Ser. No. 715,560, Aug. 18, 1976, Pat. No. 4,037,337. This application Apr. 29, 1977, Ser. No. 792,338

Int. Cl.² E02F *1/00*

U.S. Cl. 37—195 **26 Claims**



1. The method of excavating earth with a bucket having a

curved bottom, curved back and leading edge all of which are substantially V shaped, with a plurality of digging teeth mounted on the leading edge; the tooth at the center of the V leading edge being rearmost and lowermost of all teeth and having a midportion and adjacent sidewise sloping side portions; additional teeth located adjacent each other and on either side of the central tooth, with each additional tooth extending more forwardly and above the adjacent tooth as measured from the central tooth, each of the additional teeth having two integral portions with one integral portion sloping sidewise and extending further forward than the other integral portion, and the one integral portion being further away from the central tooth than the other integral portion, the method steps comprising;

simultaneously engaging the earth will all of the bucket teeth and moving in a forward direction to cut a trench with the central tooth making the deepest groove in the trench and the teeth immediately adjacent the central tooth making a shallower groove, and the teeth furthest from the central tooth making the shallowest groove;

continuously cutting material laterally across the entire trench thereby engaging and removing material in advance of the bucket to prevent the bucket leading edge from engaging and cutting material which forms the trench.

4,123,862

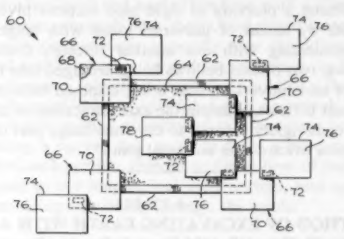
DECORATIVE DISPLAY ASSEMBLY, KIT AND METHOD OF FABRICATING SAME

Shannon L. Dyer, and Ronald L. Stangl, both of 7707 Shady Cove Ave., Sun Valley, Calif. 91504

Filed Jun. 24, 1976, Ser. No. 699,363

Int. Cl.[2] G09F *1/12*

U.S. Cl. 40—152 **12 Claims**



1. An improved kit for fabricating a decorative three-dimensional sculpture display assembly, said kit comprising, in combination:

a. frame means;

b. a plurality of stiff mounting boards adapted to receive display sheets;

c. a plurality of spacers for securing said boards and display sheets to one another and to said frame to provide a three-dimensional display assembly;

d. said frame means being comprised of a plurality of frame sections.

4,123,863

PICTURE FRAME

Rolf Becker, Schillstr. 7, D 3440 Eschwege, Fed. Rep. of Germany

Filed Dec. 13, 1976, Ser. No. 750,148

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1976, 7612798[U]

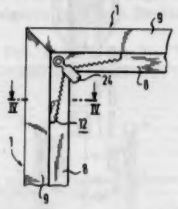
Int. Cl.[2] G09F *1/12*

U.S. Cl. 40—152 **12 Claims**

1. A device for framing a generally planar object, comprising:

(a) a plurality of resilient side molding pieces having miter-cut ends joined together end-to-end to form a plurality of joints, thereby forming a closed, generally planar frame configuration;

(b) first means pivotably attached to the end section of one of said molding pieces at a location adjacent to a first one of said joints, said first means further including second means



for engaging a portion of the other molding piece forming said first joint when said first means is pivoted into contact with said other molding piece, thereby resulting in a releasable joint; and

(c) means for fastening together the remaining ends of said plurality of molding pieces to form unreleasable joints.

4,123,864

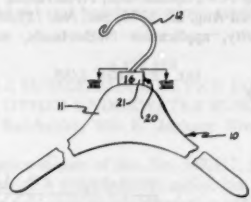
TALLY FOR ARTICLE DISPLAYS

John H. Batts, and Judd F. Garrison, both of Grand Rapids, Mich., assignors to John Thomas Batts, Inc., Zeeland, Mich.

Filed Jan. 7, 1976, Ser. No. 647,008

Int. Cl.[2] G09F *3/00*

U.S. Cl. 40—322 **37 Claims**



1. In combination, a tally and an article support, said support being suspended from above from a slender element, and upstanding boss surrounding said element at the juncture of said element and said support; a tubular tally having an internal opening snugly receiving said boss therein; identification indicia on the exterior surface of said tally.

4,123,865

SHOW WINDOW ANIMATION

Lonnie B. Pearson, 501 Sandia, Clovis, N. Mex. 88101

Filed Jan. 24, 1977, Ser. No. 761,622

Int. Cl.[2] G09F *11/00*

U.S. Cl. 40—414 **10 Claims**

1. A store display animation device for displaying merchandise for sale comprising:

a. a partial housing including

(i) a top,

(ii) a motor side,

(iii) a distal side, and

(iv) a front curtain,

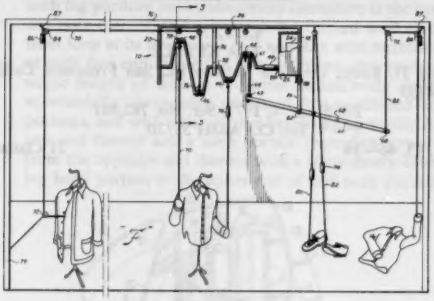
b. attachment means on the top for attaching the housing to an overhead support,

c. a motor attached to the motor side,

d. a crankshaft extending from the motor to the distal side,

e. a plurality of cranks on the crank shaft,

f. strings extending from the cranks to the merchandise to be sold, and



g. weights on the string between the cranks and the merchandise to be sold.

4,123,866

MUZZLE-LOADING HANDGUN

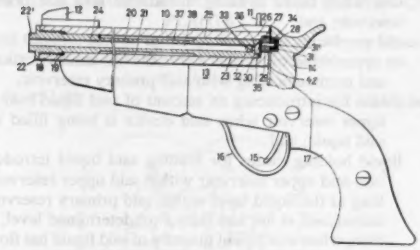
Gunter Wiethoff, Solingen, Germany, assignor to Firma Cuno Melcher KG ME-Sportwaffen, Solingen, Germany

Filed Apr. 11, 1977, Ser. No. 786,426

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1976, 7611322[U]

Int. Cl.[2] F41C *21/10*

U.S. Cl. 42—77 **11 Claims**



1. A handgun comprising:

a gunstock provided with an outer barrel and a firing mechanism including a hammer rearwardly of said outer barrel, said outer barrel having an apertured end wall;

an inner barrel with a reduced-caliber bore inserted into said outer barrel, said inner barrel having a muzzle end provided with fastening means positively engageable with a front end of said outer barrel, said inner barrel further having a rear part tightly fitted into a breech portion of said outer barrel, said rear part adjoining a rear extremity of said inner barrel having an outer diameter less than the inner diameter of said outer barrel, said end wall forming a seat for a projectile loaded through said muzzle end;

a sealing ring on said extremity in contact with said end wall;

a nipple secured to said breech porition adjacent said rear part; and

retaining means for a percussion cap between said nipple and said hammer, said nipple forming a throughgoing passage communicating with said bore.

4,123,867

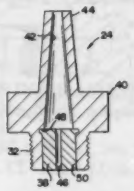
GAS EXHAUST NIPPLE FOR GUNS

Marcus L. Peterson, 2985 Silverview Dr., Cuyahoga Falls, Ohio 44224

Filed Nov. 14, 1977, Ser. No. 851,125

Int. Cl.[2] F41C *21/00*

U.S. Cl. 42—83 **6 Claims**



1. In a muzzle loading gun having a barrel with a firing or ignition orifice formed therein, the gun barrel having a bore with an inner end and having said orifice extending from the bore through the barrel wall adjacent the inner end of said bore, an insert sleeve operatively engaging said orifice, and a nipple in said sleeve and having a smaller diameter center bore than any portion of the bore of said sleeve, said nipple being made from a heat resisting metal.

4,123,868

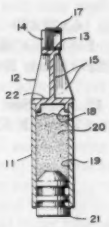
GUNPOWDER CHARGE AND PROJECTILE CONTAINER

Hugh R. Wilson, 10840 SW. 120th St., Miami, Fla. 33176

Filed Jan. 16, 1978, Ser. No. 869,905

Int. Cl.[2] F42B *39/04;* F41C *27/00*

U.S. Cl. 42—90 **3 Claims**

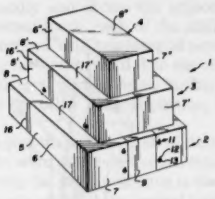


1. A gunpowder charge and projectile container comprising in combination: tube means for containing a propellant charge and a lubricated conical projectile said tube means being made of a yeildable material and having two open ends, a first end opening for receiving and retaining said projectile, a second end opening for receiving a propellant charge, closure means for closing said second end opening said closure means being removable from said second end opening, retaining means mounted on said closure means for releaseably holding a percussion cap, said retaining means being axially spaced from said tube means when said closure means is mounted on said tube means, said retaining means being yeildable to release said percussion cap when said percussion cap is placed upon a breech nipple of a firearm, whereby when said projectile is removably held in said first end opening of said tube means and a propellant charge is inserted into said tube means and said second end opening is closed by said closure means, a projectile and a propellant charge is contained.

4,123,869
GOOSE AND DUCK BLIND

Gordon Witt, Box 252, Millet, Alberta, Canada

Filed Oct. 25, 1977, Ser. No. 845,346
Int. Cl.[2] A01M *31/00*
U.S. Cl. 43—1 4 Claims



1. A game hunting blind comprising:

a box-like cap element having a top wall and side and end walls;

first and second pairs of box-like elements, each having a side wall, two end walls and a partially cutaway top wall;

means for disengagably connecting the first pair of box-like elements to form a base tier;

means for hingably and disengagably connecting each of the second pair of box-like elements with one of the base tier elements to form a middle tier wherein each of said second pair of elements rests on the partially cut-away top wall of one of the base tier elements, said hinge connection being operative to permit the middle tier elements to be pivoted outwardly;

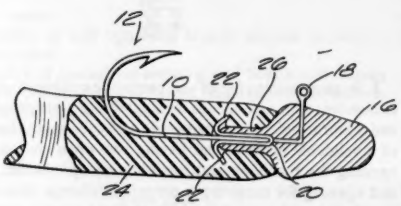
and means for hingably and disengagably connecting the cap element with a middle tier element to complete the formation of a pyramid-like structure wherein the cap element rests on the partially cut away top walls of the middle tier elements, said hinge connection being operative to permit the cap element to be pivoted outwardly;

said box-like elements being covered with a material having the appearance of straw and, when assembled in pyramid-like fashion, enclosing a space sufficient to house a hunter.

4,123,870
FISHHOOK

Edward L. Wiskirchen, 8273 Sandy Ridge Rd., Kewaskum, Wis. 53040

Filed Apr. 11, 1977, Ser. No. 786,347
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.37 4 Claims



1. A fishhook for use in casting worms and the like comprising

a barbed hook having a bent shank and an eyelet on the end of the shank

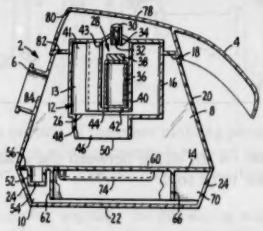
a lead sinker cast around the bent shank with the eyelet of the hook shank projecting laterally from the lead sinker, and

a barb projecting laterally from the cast sinker adjacent the shank of the hook along the portion of the shank between the hook and the bend in the shank, said barb including a wire portion which is adjacent and generally parallel to the shank of the hook and is imbedded in and retained by the lead sinker.

4,123,871
TOY TEA KETTLE

Philip H. Knott, One San Antonio Pl., San Francisco, Calif. 94133

Filed Apr. 4, 1977, Ser. No. 783,981
Int. Cl.[2] A63H *33/30*
U.S. Cl. 46—14 21 Claims



1. An amusement device in the form of a tea kettle for simulating, without heat, the boiling of water therewithin and the sound of the escape of steam therefrom, such device comprising a body having

a primary reservoir;

a lower reservoir disposed generally below said primary reservoir when said device is in a generally upright orientation;

a filling aperture extending through a side of said primary reservoir and through which liquid is introduced into said primary reservoir from outside the device;

liquid flow control and venting means joining said primary and lower reservoirs and providing for the controlled flow of liquid and air between said primary and lower reservoirs and for maintaining air within said lower reservoir while liquid is being introduced into said primary reservoir; and

sound producing means comprising

an upper reservoir spaced above the lowermost portion of and communicating with said primary reservoir,

means for introducing an amount of said liquid into said upper reservoir when said device is being filled with said liquid; and

liquid holding means for holding said liquid introduced into said upper reservoir within said upper reservoir as long as the liquid level within said primary reservoir is maintained at not less than a predetermined level, and then, when a sufficient quantity of said liquid has flowed from said primary reservoir into said lower reservoir to lower said primary reservoir liquid level below said predetermined level, for providing for both the rapid flow of liquid from said upper reservoir into said primary reservoir and the rapid introduction of air into said upper reservoir to replace said liquid flowing therefrom and to produce a sound simulating the sound of steam escaping from a tea kettle.

4,123,872
TOY ANIMAL FIGURES

Teiko Silva, R.R. 2, Box 2377A, Florida Trail, Presidential Lakes, Browns Mills, N.J. 08015

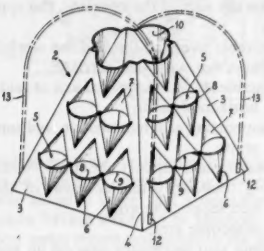
Division of Ser. No. 651,917, Jan. 23, 1976, abandoned. This application Oct. 14, 1977, Ser. No. 842,255
Int. Cl.[2] A63H *3/04*
U.S. Cl. 46—123 2 Claims

1. The method of making toy animal figures from pliable wire, paper tissue, adhesive masking tape and yarns, which comprises

(a) forming a wire skeletal framework by bending two integral lengths of wire into a central medial body portion with leg portions bent transversely therefrom at the opposite ends thereof, and with each leg formed with a reentrant loop at its lowermost end with the wire terminating at each free end above the body portions, and bending a single length of wire in a central medial body portion, substantially coextensive with said first-mentioned body portions, and with a tail portion extending upwardly from one end thereof and a neck portion extending upwardly from the opposite end thereof with a transversely extending head portion at the upper end of said neck portion,

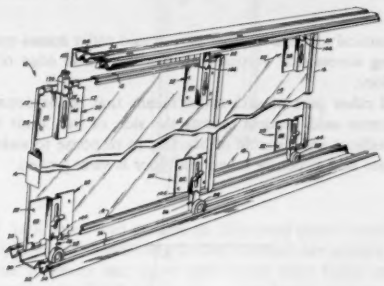
(b) binding together said three bent wire components at a plurality of points, with thin binding wire,
(c) wrapping paper tissue around at least said body portion to increase the bulk thereof and encasing said paper tissue and the remainder of the skeletal framework with adhesive masking tape,
(d) winding yarn spirally in closely contacting coils around the adhesive masking tape, and
(e) affixing ornamental components of yarn to said spiral windings at different parts thereof to simulate different species of animal pets.

4,123,873
CELLULAR STRUCTURE FOR THE CULTIVATION OF PLANTS
Roland Canova, 55, rue Rabelais, Lyon, Rhône, France (3)
Filed Apr. 20, 1977, Ser. No. 789,256
Int. Cl.[2] A01G *9/02*
U.S. Cl. 47—83 **3 Claims**



1. A cellular structure for the cultivation of plants in a growth medium, comprising a generally frustopyramidal upwardly open enclosure with upwardly converging wall elements of sheet material, each of said wall elements being formed with an array of plant-receiving pockets closely juxtaposed in several rows including a top row at an upper wall edge and a plurality of lower rows, the number of pockets increasing by one from any upper row to the next-lower one, the pockets by adjoining rows being relatively staggered, each of said pockets including an outwardly bulging upwardly open formation, each pocket of any row other than said top row further including a downwardly open inwardly bulging formation above said outwardly bulging formation, any outwardly bulging formation of a higher row being set back sufficiently to avoid overhanging corresponding formations of a lower row, said outwardly and inwardly bulging formations are of cone-segmental shape, are bisected by a common median plane perpendicular to the respective wall element, and have parallel and nearly vertical overlapping generatrices in said plane, the upper surface of the outwardly bulging formation being disposed above the lower surface of the inwardly bulging formation.

4,123,874
BY-PASS DOOR ASSEMBLY
Victor J. Scott, Spring Lake, Mich., assignor to Leigh Products, Inc., Coopersville, Mich.
Filed Jan. 31, 1977, Ser. No. 764,344
Int. Cl.[2] E05D *13/02*
U.S. Cl. 49—411 **28 Claims**



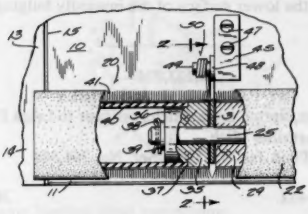
1. A door construction of the type having a pair of stile members and a pair of trim members adapted to frame a rectangular panel and a plurality of corner brackets held by said stile members and said trim members at the corners defined by said members when they are positioned on said panel at right angles to each other, the improvement comprising: said stile members each being an elongated one-piece, slot-free member having spaced front and rear walls joined by a side wall to define a panel receiving channel, said rear wall including a reversely bent portion extending towards said side wall and into said channel; said trim members each including a front wall and a rear wall joined by a base wall to define a panel receiving channel, said rear wall including a first planar portion angled towards said first wall, a longitudinally extending, outwardly directed grooved portion and a second planar portion angled away from said front wall and defining a lateral edge of said channel and wherein each of said brackets comprises:
a one-piece bracket plate having a centrally positioned channel shaped housing, said housing including side walls and an outer base wall; said outer base wall defining a longitudinally extending slot, said bracket plate adjacent the lateral edges thereof including spaced, outwardly projecting tabs, said rear wall reversely bent portion of said stile members being snapped over said tabs to capture said brackets at each of the corners defined by one of said stile members and one of said trim members, and wherein each of said brackets further includes an L-shaped tab extending from a transverse edge thereof adjacent said housing, said tab including a transverse bead and said trim member snapping over said bead and capturing said bead in said grooved portion.

4,123,875
WEATHER SEAL
Allan F. Herschberg, 3909 W. River La., Brown Deer, Wis. 53209
Filed Oct. 11, 1977, Ser. No. 840,923
Int. Cl.[2] E06B *7/22*
U.S. Cl. 49—482 **9 Claims**

1. A device for sealing the bottom edge of a door that is

installed in an opening in a structure and is swingable about a vertical axis at a side of said door, said device comprising:

roller means for being mounted for rotation on said door about an axis that is generally parallel to its bottom edge with one part of said roller means extending along said bottom edge of said door substantially on one side of said



vertical axis and another part of said roller means extending across said vertical axis beyond a side edge of said door,

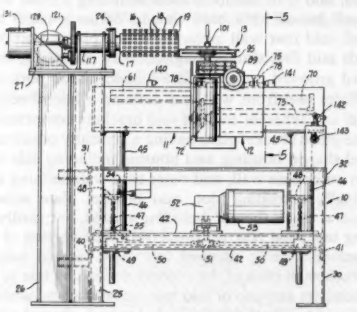
said other part of said roller means that is for extending across said vertical axis at the side of said door being resilient and capable of bending in response to swinging into said structure when said door is swung open.

4,123,876

CASTING CUT-OFF MACHINE

John H. Simmons, Lyndhurst, and Donald A. Daugherty, Euclid, both of Ohio, assignors to Precision Metalsmiths, Inc., Cleveland, Ohio

Filed Dec. 16, 1976, Ser. No. 751,261
Int. Cl.[2] B24B *19/00, 23/08*
U.S. Cl. 51—34 D **10 Claims**



1. Apparatus for severing metal pieces from a member comprising:

(a) a frame,

(b) a mandrel assembly on said frame for holding said member with its longitudinal axis in a horizontal plane,

(c) a vertically adjustable carriage support on said frame,

(d) carriage means movable along said support, and

(e) a cut-off assembly on said carriage means including cut-off means below said mandrel assembly,

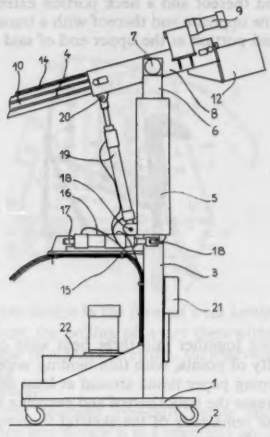
(f) said carriage means including means for laterally adjusting said cut-off assembly in a direction normal to that of carriage movement.

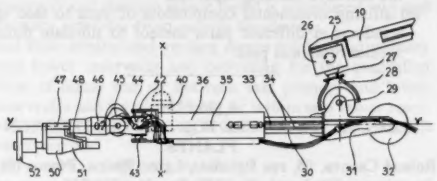
4,123,877

APPARATUS FOR SUPPORTING AND ASSISTED GUIDING OF A MACHINING TOOL

Gérard Pere, Le Breuil, France, assignor to Creusot-Loire, Paris, France

Filed Oct. 11, 1977, Ser. No. 841,529
Claims priority, application France, Oct. 29, 1976, 76 32862
Int. Cl.[2] B24B *51/00*
U.S. Cl. 51—165.9 **4 Claims**





1. Apparatus for the support and assisted guiding of a tool for machining a workpiece of large dimensions substantially without effort on the part of the operator, the apparatus comprising:

a carriage movable over the floor of the workshop;

a vertical column fast with said carriage;

a support rotatable about the vertical axis of said column and carrying a horizontal pivot;

a telescopic supporting arm mounted on said support by said horizontal pivot;

means for rotating said support about said vertical axis and for effecting translatory displacement of the telescopic portion of said supporting arm;

a secondary telescopic arm;

means mounting said secondary arm on an end portion of said telescopic portion of said supporting arm comprising a first and a second rotational displacement device, each said device comprising a first relatively fixed portion and a second portion rotatable relative thereto, said fixed portion of said first device being secured to said supporting arm, said fixed portion of said second device being secured to said rotatable portion of said first device, said rotatable portion of said second device being secured to an end portion of said secondary arm, the axis of rotation of said rotatable portion of said first device being perpendicular to the longitudinal axis of said supporting arm and the axis of rotation of said rotatable portion of said second device being perpendicular to said axis of rotation of said rotatable portion of said first device;

means for effecting translatory displacement of said telescopic portion of said secondary arm for enabling, by said translatory displacement means and said rotational displacement devices, force to be applied to a tool when mounted on the end of said secondary arm;

means for supporting and orientating a tool and secured to the end portion of the telescopic portion of said secondary arm, said means comprising first, second and third rotational displacement devices, each said device comprising a relatively fixed portion and a portion rotatable relative thereto, said fixed portion of said first device being secured to said secondary arm, said fixed portion of said second device being secured to said rotatable portion of said first device, said fixed portion of said third device being secured to said rotatable portion of said second device, said rotatable portion of said third device being adapted to be secured to a tool, the axis of rotation of said rotatable portion of said first device being perpendicular to the longitudinal axis of said secondary arm and to the axes of rotation of said rotatable portions of said other devices;

means for controlling rotation of said support and telescopic movement of said supporting arm; and

a six-position manipulator secured to said secondary arm for sensitive control of said means for effecting translatory displacement of said telescopic portion of said secondary arm and for non-sensitive control of said means for orientating the tool, movement of the tool and the application of a machining force thereto being achieved by application of a relatively low force to said manipulator and by control of said supporting arm.

4,123,878

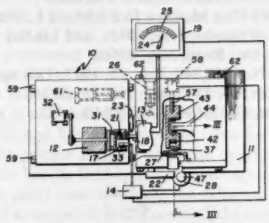
GRINDING MACHINE

Robert H. Lizotte, Leominster, Mass., assignor to Cincinnati Milacron-Heald Corp., Worcester, Mass.

Continuation of Ser. No. 638,936, Dec. 8, 1975, abandoned. This application Jul. 14, 1977, Ser. No. 815,704

Int. Cl.[2] B24B *49/18*

U.S. Cl. 51—165.87 **6 Claims**



1. A grinding machine for internal grinding, comprising:

(a) a base on which are mounted a wheelhead for carrying a rotatable abrasive wheel and a workhead for carrying a workpiece having a bore to be finished,

(b) a power meter means connected to the wheelhead to give a power signal indicative of power consumed by the wheelhead and to terminate a grinding cycle when the signal reaches an adjustable predetermined value, said meter means including control circuitry containing a switch and a bridge circuit, the bridge circuit having a first branch giving a reference signal and a second branch on which is impressed the said power signal, the switch being actuated to terminate the grinding cycle when the reference signal and the power signal are equal,

(c) a wheelsize monitor for measuring the wheel and giving a size signal indicative of the size of the wheel, and

(d) a zero shift control means receiving the signal from the wheel size monitor and adjusting the said predetermined value of the power meter means during the life of a wheel as it wears from its new wheel condition to its worn wheel condition, said predetermined value going from a high value at the new wheel condition to a low value at the worn wheel condition, said size signal being used to adjust the said reference signal with changes in wheel size.

4,123,879

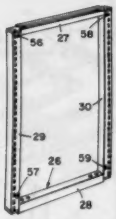
PANEL WALL SYSTEMS WITH MODULAR COMPONENT BUILD-UP

Leif Blodee, Holland; Robert L. Knapp, and Simon W. Oppenhuizen, both of Grand Rapids, all of Mich., assignors to American Seating Company, Grand Rapids, Mich.

Filed Jun. 27, 1977, Ser. No. 810,578

Int. Cl.[2] E04B *2/76*

U.S. Cl. 52—36 **4 Claims**



1. In a panel wall system, an improved panel comprising a peripheral frame including first and second side upright tubular frame members and upper and lower rigid frame members secured respectively to the upper and lower portions of said upright frame members forming a rigid peripheral frame, each of said side frame members defining a set of vertically spaced hanging slots on opposite sides thereof, and at least a pair of vertically spaced insert slots spaced inwardly of said hanging slots; first and second inserts, one on either side of said frame, each insert including a sheet of facing material and having inwardly turned edges providing a peripheral flange of substantially the same size and shape as said frame; upper and lower reinforcement means for said inserts for strengthening the same, coupling means on said reinforcement means for coupling to said insert slots on said frame; whereby said inserts are removably secured by said tabs alone to opposite sides of said frame respectively and when they are so secured, said hanging slots are recessed relative to said inserts and spaced outwardly on either side thereof so as to be accessible for removably attaching other system components to said frame, said inserts being independently removable from said frame by a lifting motion.

4,123,880

ROOF CONSTRUCTION

Tore G. Palmaer, Smultronvägen 28, S-331 00 Värnamo, Sweden

Continuation-in-part of Ser. No. 580,710, May 27, 1975, abandoned. This application Feb. 2, 1977, Ser. No. 764,815

Claims priority, application Sweden, May 31, 1974, 072240

Int. Cl.[2] E04B *1/34*

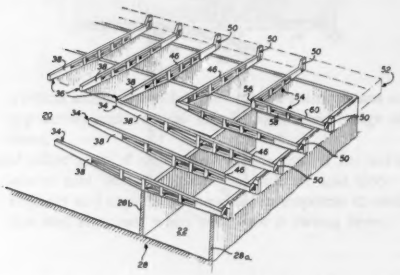
U.S. Cl. 52—73 **11 Claims**

1. A roof construction and roof support system for a single level building having a relatively large central area over which the roof is unsupported and at least four pairs of horizontally spaced peripherally extending vertical supports for the roof, each of said pairs of horizontally spaced vertical supports extending along a different side of the central area, said pairs of vertical supports extending substantially completely around and defining therewithin said central area, said roof construction comprising:

at least four sets of trusses each of which sets includes at least two generally triangular trusses each including a pair of legs angularly inclined relative to each other and con-

nected at first ends thereof and a third leg of greater length than either of said pair of legs and connected to the respective other ends thereof;

the trusses of two of said sets of trusses being disposed in opposite substantially colinear relation, the trusses of the respective ones of said two sets of trusses being spaced and parallel to each other and arranged such that one of said pair of legs of each truss is supported horizontally on the vertical supports of one of said pairs of supports, the other of said pair of legs of each truss extending upwardly in cantilevered relation above the central area of the building, and the third leg of each truss extending downwardly forming an acute angle with said one leg thereby providing a support surface for a roof covering;



the trusses of two other of said sets of trusses being disposed substantially perpendicularly to said first mentioned two sets of trusses and in opposite substantially colinear relation to each other, said two other sets of trusses being similarly supported respectively on two other of said pairs of vertical supports which extend substantially perpendicularly to the pairs of vertical supports supporting said first mentioned two sets of trusses, the trusses of said two other sets of trusses thus extending over different portions of the central area, the extremities of corresponding trusses of each of said first mentioned two sets of trusses and of said two other sets of trusses terminating in close proximity to each other.

4,123,881

WALL STRUCTURE WITH INSULATED INTERFITTING BLOCKS

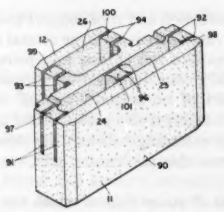
George B. Muse, Hillcrest Dr., Calhoun, Ga. 30701

Continuation-in-part of Ser. No. 548,385, Feb. 10, 1975, Pat. No. 3,998,022, which is a continuation-in-part of Ser. No. 252, Jan. 2, 1970, Pat. No. 3,864,885, and Ser. No. 462,376, Apr. 19, 1974, abandoned, each being a continuation-in-part of Ser. No. 802,450, Feb. 26, 1969, Pat. No. 3,609,926, which is a continuation-in-part of Ser. No. 658,524, Aug. 4, 1967, Pat. No. 3,479,782, and Ser. No. 730,727, May 21, 1968, abandoned. This application Dec. 13, 1976, Ser. No. 749,784

The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.

Int. Cl.[2] E04C *1/04*

U.S. Cl. 52—100 **20 Claims**



1. In a wall structure comprising a plurality of duplicate symmetrical approximately T-shaped building blocks each comprising an approximately rectangular main body section and an approximately rectangular side body section with substantially flat coplanar top surfaces and with substantially flat coplanar bottom surfaces, side walls and end walls, said side body section having approximately the same width as said main body section, said main body section being longer than said side body section and including end portions extending at its opposite ends beyond the ends of said side body section a distance at each end approximately equal to the width of said main body section, openings extending vertically through both said main body section and said side body section with the openings in said main body section extending into the central portion of each of the end portions of said main body section, a recess formed in the top surface of each of the end portions of said main body section with each recess intersecting the opening in the end portion of the main body section and the side wall of the main body section adjacent the side body section with each recess positioned centrally in the length of the end portions of said main body section, a slot defined at the intersection of each end wall of said side body section with each side wall of said main body section, with the plane of the side walls of said main body section adjacent the side body section bisecting the slots, said building blocks being arranged in horizontal courses of blocks in the wall structure with alternate ones of the blocks in each course facing opposite directions, with the end walls of the main body sections in abutment with the end walls of the side body sections, with the slots of adjacent blocks in vertical alignment with each other, and the recesses of adjacent blocks arranged in alignment with each other across the length of the course of blocks, U-shaped clips inserted in to the wall structure with the base of the U-shaped clips positioned in the aligned recesses of adjacent blocks and the legs of the clips extending into the openings of the end portions of said main body section of the building blocks whereby the facing side walls of adjacent ones of the building blocks in the wall structure are held in abutting relationship.

4,123,882

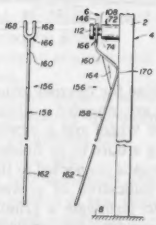
METHOD OF AND APPARATUS FOR ERECTIGN CONCRETE WALL PANELS

James E. Case, 943 Glen Meadow Dr.; Richard L. Ruppert, 439 Steffanie, both of Sparks, Nev. 89431, and Lindley Manning, 4585 Clearview Dr., Reno, Nev. 89502

Division of Ser. No. 767,880, Feb. 11, 1977. This application Nov. 14, 1977, Ser. No. 851,592

Int. Cl.[2] B66C *1/66;* E04B *1/00*

U.S. Cl. 52—125 **9 Claims**



1. In combination with a pickup device adapted for releasable connection to a tubular member which is embedded in a concrete panel, defines an opening in the panel and includes a shoulder disposed interiorly of the opening, said pickup device being adapted when connected to the tubular member to serve as a medium for lifting the concrete panel and then erecting the panel upright, said pickup device comprising an elongated, generally cylindrical housing having a first end defining an enlarged housing portion for positioning in the opening and including an internal cavity, a second end, a bore communicating the cavity with the second end, and a plurality of radially

oriented cutouts disposed in a common plane and communicating the cavity with the exterior of the housing, a plate engaging the housing exterior and disposed between the enlarged portion and the second end of the housing, the plate being axially and rotatably movable with respect to the housing and including a lifting bail, the plate being disposed perpendicular to the housing axis and having a collar depending from the plate towards the enlarged housing portion, the collar having a diameter substantially equal to the enlarged housing portion diameter, a lug slidably disposed in each cutout, each lug being dimensioned to be wholly disposed interior of the housing and to be moved along its cutout in a radial direction to protrude from the housing into interlocking engagement with the shoulder on the tubular member, a side of each lug facing the axis of the housing having first and second contiguous surface sections which are, respectively, parallel to the housing axis and inclined thereto the inclined surface section facing the second housing end, an elongated plunger axially movably disposed in the housing bore and extending from the cavity past the second housing end, the end of the plunger disposed in the housing having first and second surfaces which are, respectively, generally parallel to the first and second surface sections of the lugs, the second surface of the plunger being angularly inclined with respect to the plunger axis and facing away from the second housing end, the second and first lug surface sections being arranged so as to be sequentially engaged by the second and first plunger surfaces in order thereby to move the lugs radially outward into their extended position and mechanically lock the lugs in their extended position when the plunger is moved in the direction in which its second surface faces, the second plunger end including a release surface disposed exteriorly of the housing and facing towards said housing, such release surface being adapted to have a force applied thereto for moving the plunger in the opposite direction, spring means biasing the plunger towards the housing cavity and into engagement with the lugs, means secured to the plunger for limiting spring means induced plunger travel and for applying to the plunger a force directed opposite to the spring means exerted force for movement of the plunger in the opposite direction against the force exerted by the spring means, and means for retracting the lugs into the cutouts and towards the housing cavity in response to a plunger movement in the opposite direction; a pickup device release tool having an elongated actuating handle of a sufficient length to be handheld by an operator positioned on the ground adjacent to the concrete panel when in its upright position so that a first end of the handle is adjacent to the pickup device while the latter is releasably connected to the tubular element in the panel, said first handle end having an upright open fork dimensioned to engage the release surface when the operator holds the tool upright, the handle further including a curved portion defining a fulcrum point near the fork, the fulcrum point being positioned and arranged so that it contacts the concrete panel when the fork contacts the release surface while a remainder of the handle extends downwardly and obliquely away from the wall, whereby the operator can move the plunger in the opposite, lug-retracting direction while pushing the handle remainder towards the panel while the fulcrum point is in abutment with the panel.

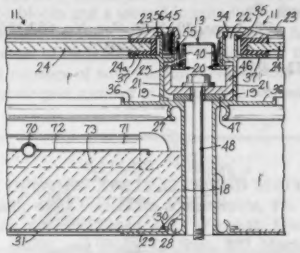
4,123,883

SOLAR ENERGY COLLECTOR

Everett M. Barber, Jr., Guilford, and Thomas P. Hopper, Durham, both of Conn., assignors to Sunworks, Inc., Guilford, Conn.

Filed Feb. 28, 1977, Ser. No. 772,971
Int. Cl.[2] E04B 7/18
U.S. Cl. 52—200 **25 Claims**

1. A housing for a solar energy collector comprising wall members defining side and end walls and a bottom wall, said wall members having an indentation along the sides thereof defining a lower shoulder and an upper surface above said shoulder, a flashing reglet extending upwardly from said upper surface, and a cap member adapted to be fitted to said housing over said wall members and retain a cover on said housing, said



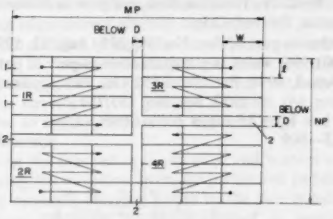
reglet extending along said wall members and having an upper opening outwardly from said cap.

4,123,884

MODULAR CONSTRUCTION FOR PREFABRICATED HOUSE

Shuhichi Nakatani, Osaka, Japan, assignor to Kubota Tekko Kabushiki Kaisha, Osaka, Japan

Filed May 3, 1977, Ser. No. 793,347
Claims priority, application Japan, Oct. 7, 1976, 51-121437
Int. Cl.[2] E04B 5/48
U.S. Cl. 52—220 **8 Claims**



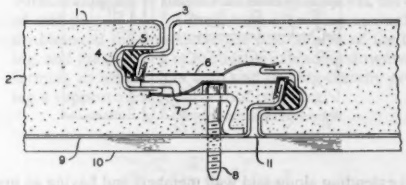
1. A prefabricated house having a ceiling plane defining inside dimensions extending between inside surfaces of house outer walls, said house further including a plurality of partition wall panels disposed vertically to said ceiling plane inside said outer walls to form a partition wall, some of said partition wall panels being blind ones and at least one of them being open, said ceiling plane comprising reference ceiling panels with their longitudinal dimension equal to or greater than $MP/m - D/m$ and with their lateral dimension equal to or greater than $NP/n - D/n$, wherein MP is the longitudinal inside dimension of the ceiling plane, NP is the lateral inside dimension of the ceiling plane, m is the number of ceiling panels to be longitudinally disposed, n is the number of ceiling panels to be laterally disposed, and D is the thickness of a partition panel wall, said ceiling panels normally abutting adjacent ceiling panels, but being positioned to leave gaps with a dimension less than D upon disposition thereof, whereby blind ones of said partition wall panels are disposed immediately below said gaps along a modular line and open ones are offset from said modular line to have their one or two end portions lapped in parallel with their adjacent blind one, thereby compensating for modular deviations with the resulting lapped portions.

4,123,885

BUILDING PANEL JOINT

Harley D. Scott, Wexford, Pa., assignor to Cyclops Corporation, Pittsburgh, Pa.

Filed Apr. 30, 1976, Ser. No. 682,156
Int. Cl.[2] E04B *5/52*
U.S. Cl. 52—483 **7 Claims**



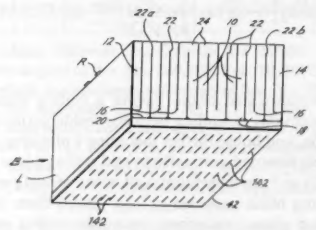
1. In a wall structure comprising a pair of vertically extending panels having ends secured together by fastening them to flanges of a side girt, the panels being of the type having a foam core bonded to exterior and interior metal skins which are vertically offset and spaced apart by said foam core; the improvement in the end joint between said panels comprising a clip having an upper land engaging the extremity of the exterior metal skin of each panel and having an intermediate land with at least one hole through which a fastener screw extends and which is screwed into the supporting girt, the support portion of said clip being laterally bent to provide a large surface area of support on the interior metal skin and girt.

4,123,886

REFRACTORY FIBER BLANKET MODULE WITH INCREASED INSULATION

Carlisle O. Byrd, Jr., Houston, Tex., assignor to Johns-Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 603,391, Aug. 11, 1975, Pat. No. 4,001,996, which is a continuation-in-part of Ser. No. 475,439, Jun. 3, 1974, Pat. No. 3,952,470. This application Jan. 7, 1977, Ser. No. 757,750
Int. Cl.[2] E05B *1/80;* C04B *43/02*
U.S. Cl. 52—509 **5 Claims**



1. An insulating block for lining a wall of a furnace and like equipment comprising:

(a) an insulating blanket folded into a plurality of adjacent layers of fiber insulating material and having folds formed between said adjacent layers alternately at outer and inner ends thereof, respectively;

(b) means for attaching said insulating blanket to the wall of the furnace, said means for attaching including a support member mounted in at least one of said outer folds;

(c) said insulating blanket further including inner end portions connecting adjacent layers of said blanket at inner ends thereof to form said inner folds;

(d) said inner end portions having fibers transversely disposed to the direction of the heat flow towards the furnace wall to increase the insulating capacity of said insulating block; and

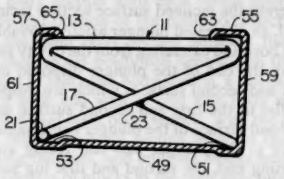
(e) a ceramic fiber blanket mounted with said insulating blanket along said inner end portions and covering same, said ceramic fiber blanket further being attached to said insulating blanket by high temperature metal oxide thread.

4,123,887

STRENGTHENING OF CHANNEL SHAPED BUILDING COLUMNS AND BEAMS

Roger N. Weinar, 168 W. Woodside Ave., Buffalo, N.Y. 14220

Filed Jul. 6, 1977, Ser. No. 813,335
Int. Cl.[2] E04C *3/32*
U.S. Cl. 52—720 **10 Claims**



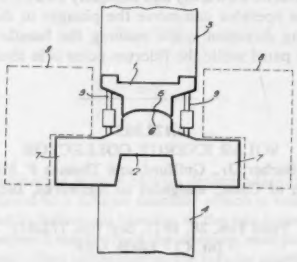
1. A rigidized hollow, elongated sheet metal channel structural member of generally squared C shape in cross-section which comprises an elongated sheet metal channel structural member of generally squared C shape in cross-section, reinforced and rigidized so that the flanges of the channel resist deflections inwardly, by insertion therein of a rigidizing bridge having a transverse intermediate portion, a pair of inclined crossing leg portions, each joined to the intermediate portion, and a pair of opposing foot portions, each joined to a leg portion and adapted to fit in the interiors of opposed corners of the channel between the flanges thereof and the connecting part, said rigidizing bridge being located so that the transverse intermediate portion thereof is between the channel flange ends and at right angles to them and the feet thereof are in the interiors of opposed corners of the channel and parallel thereto and hold the transverse intermediate portion of the bridge in position at right angles to channel flanges.

4,123,888

LENGTHENING JOINT FOR CONCRETE OBJECTS

Antero Kajava, Espoo, Finland, assignor to Paraisten Kalkki Oy - Pargas Kolk Ab, Helsinki, Finland

Filed Jun. 10, 1977, Ser. No. 805,529
Claims priority, application Finland, Jun. 14, 1976, 761704
Int. Cl.[2] E04C *3/34*
U.S. Cl. 52—726 **4 Claims**



1. A lengthening joint for use between a first concrete object and a second concrete object, the first concrete object having one surface to be secured on one surface of the second concrete object, comprising a first joint component and a second

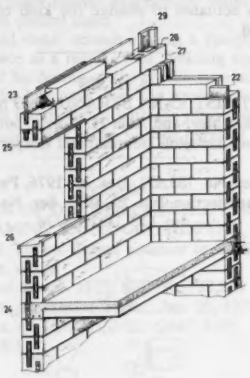
joint component, the first joint component having a first surface on one side thereof adapted to engage the one surface of the first concrete object and a second surface on the side thereof opposite the first surface thereof, the second joint component having a first surface on the one side thereof adapted to engage the one surface of the second object and a second surface on the side thereof opposite the first surface thereof, the second surface of the first joint component having a protuberance, and the second surface of the second joint component having a recess, and the second surface of the first joint component mating with the second surface of the second joint component, characterized by the improved construction wherein the first and second joint components are constructed of concrete of higher strength than the concrete of the first concrete object and the second concrete object, and the cross sectional area of the second surface of the first joint component is smaller than the cross sectional area of the first surface of the first joint component.

4,123,889

PROCESS OF CONSTRUCTION OF A THERMAL INSULATING WALL

Roger Deloupy, 397 bis route de Saint-Simon, 31300 Toulouse, France

Filed Dec. 14, 1976, Ser. No. 752,269
Claims priority, application France, Dec. 18, 1975, 75 39217
Int. Cl.[2] E04G *21/14*
U.S. Cl. 52—744 **5 Claims**



1. A process for constructing a thermally insulated wall comprising:

providing a plurality of construction blocks, each having the form of a prism with two recesses extending along the entire length on parallel, opposite faces of the prism, said recesses being staggered on either side of a median longitudinal plane of said faces, said recesses each having a depth greater than half the distance between said faces, each of said recesses being closed by covers integrally formed with said blocks and joined to said blocks along score lines,

removing said covers by breaking along said score lines,

arranging a first quantity of said blocks end to end in a first row so that said recesses open to the top and bottom, said recesses in adjacent blocks forming a continuous cutout along each row,

placing a rigid insulating strip having a height of approximately twice the depth of one of said recesses into said continuous cutout,

arranging a second quantity of said blocks end to end in a second row above said first row and aligned so that said insulating strip is located in the bottom cutout of said second row,

providing an opening in said wall,

placing lintel blocks end to end at the top of said opening, said lintel block each having the form of a prism and being provided with a first recess in the top face thereof and positioned opposite the recess in the bottom face of said construction blocks and a second longitudinal recess having a T-shaped cross section in said top face, said first and second recesses of each block being aligned with the first and second recesses of adjacent lintel blocks, and

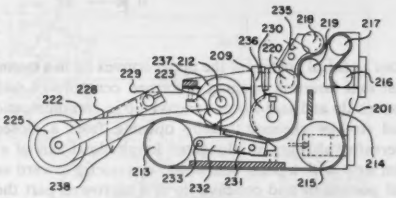
casting a concrete post member in said aligned second recesses.

4,123,890

ENVELOPE OPENING APPARATUS AND METHOD

Robert J. Russell, 4300 Potter St., Philadelphia, Pa. 19124; William Young, 407 N. Clinton Ave., Wenonah, Gloucester County, N.J. 08090, and Barry D. Nuss, 893 Marian Rd., Woodbury, Gloucester County, N.J. 08096

Continuation of Ser. No. 486,077, Jul. 5, 1974, abandoned, which is a division of Ser. No. 289,314, Sep. 15, 1972, Pat. No. 3,822,523. This application Dec. 29, 1976, Ser. No. 755,577
Int. Cl.[2] B65B *43/26*
U.S. Cl. 53—396 **14 Claims**



1. The method of opening envelopes comprising

conveying the envelopes edgewise on a first conveyor to a position between opposed protective paddles leaving the leading edge thereof slightly exposed;

closing the paddles to grip the envelope;

weakening the exposed leading edge;

opening the paddles above a second conveyor and conveying the envelopes to a position between the protective paddles to slightly expose the opposite edge and bottom edge thereof;

weakening the exposed opposite edge and bottom edge;

discharging the envelope from the protective paddles; and

applying opposed shearing forces to the side panels of the envelope following discharge thereof to separate the panels at the weakened edges thereof and expose the contents of the envelope.

10. The method of opening an envelope having length and width and having three sides thereof weakened comprising,

first further weakening the said three weakened sides by exerting opposing shearing forces to the panels of the envelope, said shearing forces being applied along the entire width of the envelopes in a plane generally parallel to the panels while preventing substantial relative displacement of said panels with respect to each other; and

secondly applying opposing separating forces generally perpendicular to the panels to separate them and expose the contents.

4,123,891

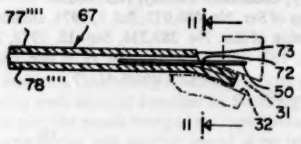
MICROFILM JACKET MICROFILM-FEEDING PROCESS

Paul A. Kiejzik, 2907 Monterey Ct., Springfield, Pa. 19069

Division of Ser. No. 611,004, Sep. 8, 1975, Pat. No. 4,003,187. This application May 13, 1976, Ser. No. 845,482
Int. Cl.[2] B65B *43/26, 5/08, 5/12*
U.S. Cl. 53—435 **2 Claims**

1. A microfilm jacket film insertion process comprising in combination: employing a microfilm jacket having upper and

lower layers joined at spaced-apart points forming a storage channel and having an arced slit in the upper layer, the upper layer and arced slit jointly consisting of an upper convex lip as a part of a first section of the microfilm jacket and a lower concave lip as a part of a second section of the microfilm jacket adapted to form an insertion opening solely when the second portion is pressed to an angle with the first section; fixedly supporting the first portion on a support structure, said first portion being supported at a location on the microfilm jacket adjacent to and at one side of said arced slit beneath said upper convex lip; flexing said second portion located on an opposite side of the arced slit, downwardly, carrying downwardly said lower concave lip, said flexing being sufficient to move a central portion of the lower concave lip downwardly away-



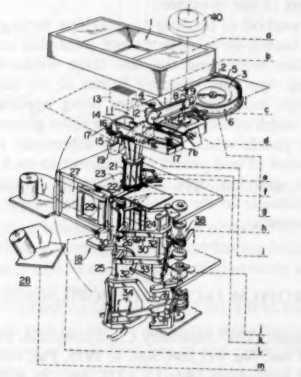
from a central portion of the upper convex lip in a manner such that said insertion opening is formed centrally of said upper convex lip and said lower concave lip in communication with said storage channel thereby opening from a closed state; thereafter aligning an elongated longitudinal axis of a microfilm strip with a point below said convex lip toward said central portion of said concave lip at a narrowed part thereof in substantially parallel alignment with a longitudinal axis of said storage channel; and thereafter advancing at least one of the microfilm jacket and the aligned microfilm strip toward the other thereof sufficiently for microfilm to press against the lower concave lip to be thereby guided by an upper face of said lower concave lip and a lower face of said convex lip into said insertion opening.

4,123,892

COIN PACKAGING MACHINE

Kazuto Asami, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Himeji, Japan

Filed Oct. 12, 1976, Ser. No. 731,822
Claims priority, application Japan, Oct. 9, 1975, 51-121920
Int. Cl.[2] B65B *57/10*
U.S. Cl. 53—54 **4 Claims**



1. A coin packaging machine for packaging different kinds of packages each containing a preselected number of coins of a preselected denominations, which comprises:

a kind of package selecting means of selectively specifying the kind of packages to be packaged;

at least one stacking cylinder for stacking coins received therein;

packaging means for receiving coins stacked in said stacking cylinder and wrapping the stack of coins with packaging paper and discharging the wrapped stack of coins through discharge path;

a paper feeding section for feeding packaging paper to said packaging means;

coin conveying means for conveying coins to be packaged to said stacking cylinder;

coin counting means operatively associated with said coin conveying means for counting the number of coins conveyed by said coin conveying means;

control and drive means connected to said kind of package selecting means, said packaging means, said paper feeding section, said coin conveying means and said coin counting means for conveying and counting coins and stacking and wrapping the conveyed and counted coins in accordance with the kind of package selected by said kind of package selecting means; and

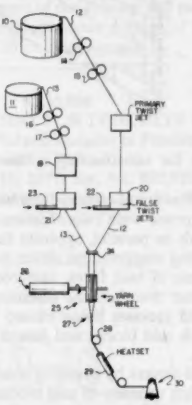
removing means connected to said kind of package selecting means and operatively associated with said stacking cylinder and said packaging means for removing any wrapped package of coins from said packaging means and for removing any coins left in said stacking cylinder through said discharge path when said kind of package selected means is actuated to change the kind of package to be packaged.

4,123,893

SELF TWIST YARN STRAND AND METHOD

Phillip W. Chambley, and Alan H. Norris, both of Rome, Ga., assignors to Champion International Corporation, Stamford, Conn.

Division of Ser. No. 755,671, Dec. 30, 1976, Pat. No. 4,074,511.
This application Jun. 29, 1977, Ser. No. 811,380
Int. Cl.[2] D02G *3/26*
U.S. Cl. 57—204 **2 Claims**



1. A process for the formation of a self-twist plural yarn strand, which process comprises separately forming at least two single strands, twisting each of said strands individually to form twisted strands each having longitudinally spaced nodes at which the direction of twist reverses, fastening each of said strands to one another at said nodes by twisting fibers located at the node of one strand to the corresponding fibers of each other strand, while holding the single yarns separate, redistributing and levelling the stored torques in said twisted yarn strands between the longitudinally spaced nodes in each

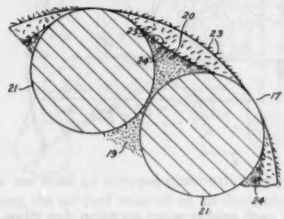
strand, and self-twist plying said strands between said nodes to produce a self-twist plural stand yarn.

4,123,894

SEALED WIRE ROPE

Charles R. Hughes, Hellertown, and Darral V. Humphries, Allentown, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Aug. 5, 1977, Ser. No. 822,190
Int. Cl.[2] D07B *1/16*; D02G *3/36*
U.S. Cl. 57—220 **10 Claims**



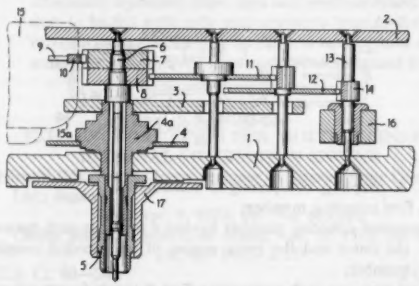
1. A corrosion resistant wire rope comprising:
(a) a central core,
(b) a series of foam plastic impregnated outer strands surrounding the central core,
(c) each of said outer strands having a rough fibrous and porous surface as a result of an abrading operation after foaming and hardening of the plastic material, and
(d) a grease-like lubricant over the exposed surface of the outer strands intermingled with the fibrous surface of the strand and contained in the surface pores of the plastic.

4,123,895

GEAR TRAIN OF QUARTZ-CRYSTAL TIMEPIECE HAVING ANALOGUE DISPLAY

Joichi, Miyazaki, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jan. 3, 1977, Ser. No. 755,218
Claims priority, application Japan, Jun. 18, 1976, 51-71790
Int. Cl.[2] G04B *19/02*; G04C *3/00*
U.S. Cl. 58—23 BA **2 Claims**



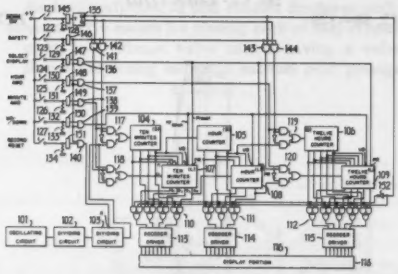
1. In a timepiece: an electro-mechanical transducer; a seconds gear wheel mounted for rotation and rotated to indicate passage of time in units of seconds; a battery for powering said electro-mechanical transducer; a plate having said seconds gear wheel, said battery and said electro-mechanical transducer disposed thereon; mounting means for rotatably mounting said seconds gear wheel on said plate; and a gear train engaging said seconds gear wheel and said electro-mechanical transducer for rotating said seconds gear wheel to indicate passage of time in units of seconds upon operation of said electro-mechanical transducer, said gear train comprising at least two gear wheels each engaging a respective one of said electro-mechanical transducer and said seconds gear wheel, and wherein at least one of said two gear wheels is an idle gear; and wherein said seconds gear wheel has a radius smaller than a difference between a radius of said plate and a diameter of said battery, and said plate has a diameter less than 26 millimeters.

4,123,896

DIGITAL ELECTRONIC TIMEPIECE

Kazuhiro Asano; Takehiro Ishikawa; Kazumasa Yasuda, and Takashi Ishijima, all of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Oct. 8, 1976, Ser. No. 731,108
Claims priority, application Japan, Oct. 9, 1975, 50-121992
Int. Cl.[2] G04F *3/06*
U.S. Cl. 58—39.5 **5 Claims**



1. A digital electronic timepiece comprising means for generating a time standard signal, frequency dividing means for dividing said time standard signal to produce a divided signal, first time counting means for counting said divided signal to generate a first time signal, second time counting means for counting said divided signal to generate a second time signal said second time counting means comprising an up/down counter, digital time display means for displaying a time signal, manually controlled display selecting means for connecting said first and second time counting means alternatively with said display means for displaying said first time signal or said second time signal respectively, manually controlled means for amending the count of said first time counting means, manually controlled means for amending the count of said second time counting means selectively to increase the count or to decrease the count of said second time counting means, and means for connecting said second time counting means with said first time counting means to transfer the time signal of said first time counting means to said second time counting means.

4,123,897

SECOND JUMPER SPRING

Motohiro Sano, and Ryoichi Ohki, both of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jun. 1, 1976, Ser. No. 691,843
Claims priority, application Japan, Jun. 4, 1975, 50-67173
Int. Cl.[2] G04B *17/32*
U.S. Cl. 58—59 **17 Claims**

1. A jumper spring for use in a timepiece to releasably hold a toothed wheel of the timepiece comprising: a spring member having an elongated arm portion, and a generally V-shaped projecting portion connected to said arm portion; a sputtered layer of chromium covering part of said projecting portion;

and a sputtered layer of material overlying said layer of chromium, said material being selected from the group consisting of

a hard material or a material having a low coefficient of friction.

4,123,898

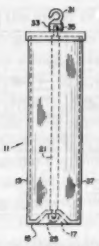
COUNTERWEIGHT SHELL FOR CLOCKS

Paul C. Diels, 6909 Lahser Rd., Birmingham, Mich. 48010

Filed Apr. 28, 1976, Ser. No. 681,120

Int. Cl.[2] G04B *17/02*

U.S. Cl. 58—129 **1 Claim**



1. A counterweight shell for clocks comprising an elongated hollow body of cylindrical shape, open at one end, a bottom wall as an integral part of the body and having a central aperture;

a rod with its opposite ends threaded, axially nested within said body with one end projected through said bottom wall;

a nut threaded over said rod one end and bearing against said bottom wall;

a top cap having a central aperture and an integral annular flange nested over the open end of said body;

the other end of said rod projected through said cap;

and a hook having an apertured shank receiving and threaded onto said rod other end and retainingly engaging said cap;

said bottom wall having a central portion indented into said body, said nut along its height being completely enclosed within said indentation; and

said body, bottom wall and cap being of brass.

4,123,899

METHOD FOR BENDING CHAIN LINKS AND CHAIN LINK BENDING MACHINE

Herbert Windelbandt, Aachen-Laurensberg, and Günter Ditges, Rodenkirchen-Weiss, both of Germany, assignors to Meyer, Roth & Pastor Maschinenfabrik GmbH, Cologne, Germany

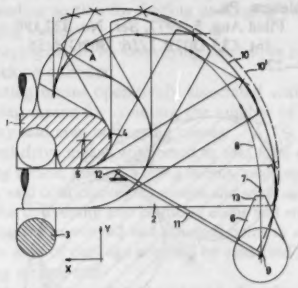
Filed Jul. 12, 1976, Ser. No. 704,685

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1975, 2531290

Int. Cl.[2] B21L *1/02*

U.S. Cl. 59—27 **9 Claims**

1. In a method of forming chain links from wire pins each having a given length and two free ends, including the steps of positioning the pin in the zone of a mandrel having opposite arcuate work faces each having a center of curvature, positioning bending tools in the zone of each free end and engaging the pin by the bending tools at a contact location in the zone of each free pin end and bending the zones of the free pin ends about the respective work faces of the mandrel by the bending tools, wherein the improvement comprises the step of guiding each said bending tool, during the bending step, in a curved



path such that each said contact location describes, at least in the final phase of the bending step, at least approximately, a circular involute, the reference point of which coincides with the center of curvature of the respective work faces for substantially preventing displacement of each said contact location along the pin during the bending step.

4,123,900

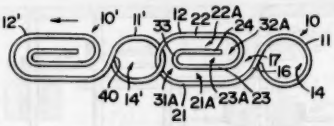
COUPLING DEVICE

Alexander M. Sadowski, 2073 San Sebastian Way, North, Clearwater, Fla. 33515

Filed May 19, 1977, Ser. No. 798,327

Int. Cl.[2] F16G *15/04*

U.S. Cl. 59—83 **16 Claims**



1. A coupling, comprising in combination:

a first coupling member;

a second coupling member having a tortuous path between the outer and the inner region of said second coupling member;

said tortuous path comprising first through fourth substantially linear sections and first through third interconnecting sections sequentially interposed between said first through fourth linear sections;

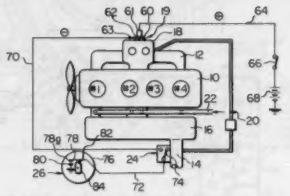
said first through fourth substantially linear sections being substantially parallel to one another; and

means establishing said first coupling member to be at least partially receivable in said second coupling member for passing said first coupling member through said tortuous path to couple said first coupling member to said second coupling member.

4,123,901
AIR-FUEL RATIO CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH A THERMAL REACTOR

Kenji Masaki, Yokohama, and Suzuo Suzuki, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Sep. 2, 1976, Ser. No. 719,699
Claims priority, application Japan, Sep. 11, 1975, 50/110164
Int. Cl.[2] F02B *75/10*
U.S. Cl. 60—277 **12 Claims**



1. For use with an internal combustion engine, a system for controlling the air-fuel ratio of an air-fuel mixture fed through a carburetor, into said internal combustion engine having a thermal reactor in its exhaust system, comprising:

carburetor-actuating means connected to a carburetor of an internal combustion engine and having first and second states thereof, said first state being a state wherein said carburetor is actuated to feed the engine with a relatively lean air-fuel mixture and said second state being a state wherein said carburetor is actuated to feed the engine with a relatively rich air-fuel mixture, said carburetor-actuating means including at least one electromagnetic valve fluidly connected to said carburetor, the electric energization and de-energization of said electromagnetic valve respectively inducing said first and second states;

a temperature sensor for sensing the temperature of said thermal reactor on said engine; and

control means for allowing said electromagnetic valve to be continuously de-energized while said temperature sensor senses a temperature below a predetermined level and to be alternately energized and de-energized while said temperature sensor senses a temperature above said predetermined level, said control means including synchronizing means allowing predetermined cylinders of said engine to be fed with only said relatively rich air-fuel mixture and alternately cylinders other than said predetermined cylinders to be fed with only said relatively lean air-fuel mixture during a condition wherein said temperature sensor senses the temperature above said predetermined level.

4,123,902
EXHAUST PORT LINER FOR MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Hiroshi Iida, Tokyo, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Apr. 9, 1976, Ser. No. 675,626
Claims priority, application Japan, Apr. 11, 1975, 50/44011
Int. Cl.[2] F01N *3/10*
U.S. Cl. 60—282 **2 Claims**

1. A multi-cylinder internal combustion engine system comprising:

an engine block having at least two cylinders;

a plurality of pistons slidably disposed in said cylinders respectively, for reciprocal movement;

an engine head securely attached to said engine block to close said cylinders and cooperating therewith to form a plurality of main combustion chambers within said cylinders, respectively;

said engine head having a plurality of auxiliary combustion chambers connected to said plurality of main combustion chambers, respectively, by respective nozzles which are formed within said engine head;

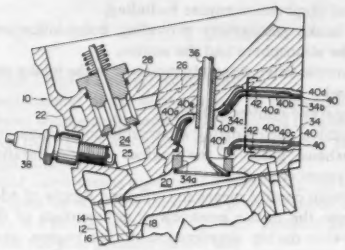
means for supplying a lean air-fuel mixture to the main combustion chamber during the induction stroke of each of said pistons, which is formed within the cylinder having therein said each piston and a rich air-fuel mixture to the auxiliary combustion chamber connected to said main combustion chamber;

a spark plug having its electrode exposed to each of said auxiliary combustion chambers to ignite the rich air-fuel mixture therein thereby to cause a torch flame to propagate through the nozzle toward the main combustion chamber to initiate combustion of the lean air-fuel mixture therein;

said engine head having an exhaust port passage which has two exhaust intake ends opening to said main combustion chambers, respectively, an exhaust discharge end and a wall defining said exhaust port passage;

a port liner fixedly mounted by casting within said exhaust port passage and having two exhaust intakes adjacent to said exhaust intake ends, respectively, and an exhaust discharge adjacent to said exhaust discharge end;

exhaust valve means for closing each of said exhaust intake ends, said exhaust valve means having a valve guide sleeve projecting into said exhaust port passage and a



valve member cooperating with one of said exhaust intake ends, said valve member having a stem slidable extending through said valve guide sleeve;

said port liner having two apertures for permitting said valve guide sleeves to extend, respectively;

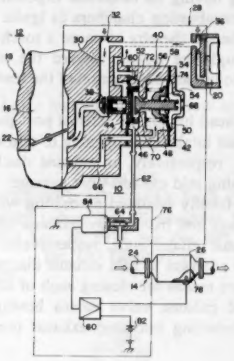
said port liner having a multiple walled construction formed by at least two metal tubes which are partially spaced from each other to form a continuous space therebetween, said space surrounding substantially all areas on the outer surfaces of an inner one of said metal tubes, said metal tubes being joined at areas adjacent to said exhaust intakes, at areas adjacent to the edges of said apertures, and at an area adjacent to said exhaust discharge thereby to close said space, said port liner being cast into said engine head when assembled, said port liner having an end portion at each of said exhaust intakes thereof which is embedded into said engine head, said two metal tubes being joined with each other at the area adjacent to said exhaust discharge of said port liner, in which said outermost metal tube and said wall defining said exhaust port passage cooperate with each other to form another space surrounding the outer surface of said outermost metal tube, in which said another space is continuous, and in which said another space communicates with an exhaust flow passage defined by said inner metal tube through said apertures.

4,123,903

DECELERATION CONTROL SYSTEM

Yoshimasa Hayashi, Yokohama, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Dec. 28, 1976, Ser. No. 755,032
Claims priority, application Japan, Dec. 29, 1975, 50/156011
Int. Cl.[2] F02B *75/10*; F02D *31/00*
U.S. Cl. 60—277 **8 Claims**



1. A deceleration control system in combination with an internal combustion engine including

an intake passageway providing communication between the atmosphere and the engine,

a throttle valve rotatably mounted in the intake passageway, and

a catalytic converter having

a catalyst for oxidizing a burnable component contained in exhaust gases of the engine, said deceleration control system comprising

vacuum control means for effecting supply of additional air into the intake passageway downstream of the throttle valve during deceleration of the engine, said vacuum control means having a first position effecting said supply of additional air and a second position stopping said supply of additional air,

operating means for moving said vacuum control means into said first position in response to deceleration of the engine and for moving said vacuum control means into said second position in response to operations of the engine other than deceleration,

cancel means for causing said operating means to move said vacuum control means into said second position when the temperature of the catalyst is below a predetermined temperature during deceleration of the engine,

sensing means for sensing the temperature of the catalyst for generating an output signal representative of the sensed temperature,

a modulator electrically connected to said sensing means for comparing the value of said output signal with a reference value representative of said predetermined temperature for generating a command signal when said output signal represents a temperature of the catalyst below said predetermined temperature during deceleration of the engine, and

solenoid means operatively connected to said cancel means and having

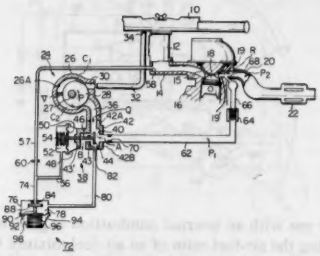
a solenoid electrically connected to said modulator for moving, in response to said command signal during deceleration of the engine, said cancel means into a position causing said operating means to move said vacuum control means into said second position.

4,123,904

APPARATUS FOR INTRODUCING SECONDARY AIR INTO AN INTERNAL COMBUSTION ENGINE

Takao Nonoyama, Toyota; Toshiro Harada, Okazaki, and Yukio Suzuki, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 2, 1976, Ser. No. 746,793
Claims priority, application Japan, Sep. 3, 1976, 51-105031
Int. Cl.[2] F01N *3/10, 3/15*
U.S. Cl. 60—290 **4 Claims**



1. An apparatus for introducing secondary air into an exhaust system of an internal combustion engine fitted with a catalytic converter comprising:

an air pump driven by the crankshaft of said engine for supplying secondary air;

first pipe means having a first end connected to said exhaust system at a position located upstream of said catalytic converter;

second pipe means having a first end connected to an intake system of said engine;

vacuum operated flow control valve means coupling a second end of said first pipe means to the output of said air pump; said flow control valve means having a control input coupled to a second end of said second pipe means and being responsive to an engine intake vacuum signal for controlling the amount of secondary air from the output of said air pump which is introduced into said pipe means and for discharging excess secondary air emitted from said air pump which is not introduced into said pipe means;

a third pipe means having one end connected to said vacuum operated flow control valve means for sensing the pressure of said introduced secondary air; and

pressure control valve means having a control input connected to a second end of said third pipe means and being responsive to the pressure of said introduced secondary air to controllably decrease the effect of said intake vacuum signal applied to said vacuum operated flow control valve to maintain a predetermined constant non-zero pressure level of said introduced secondary air in said first pipe means.

4,123,905

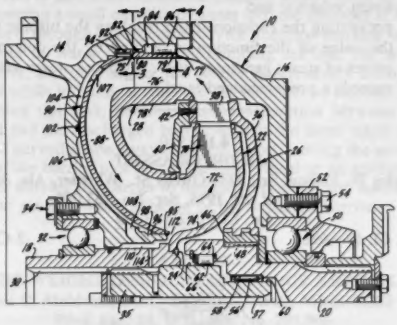
TORQUE CONVERTER ASSEMBLY

Paul Posega, Jr., Rockford, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 27, 1977, Ser. No. 801,140
Int. Cl.[2] F16D *33/00*
U.S. Cl. 60—361 **16 Claims**

1. A hydrodynamic device comprising a fixed housing carrying a vaned stator element and vaned turbine and impeller elements cooperating with said housing and stator element to define a toroidal chamber for fluid flow therethrough, fluid flow through said turbine and impeller being at generally right angles to the axis of rotation of the device, fluid flow through said stator being in a direction parallel to the axis of rotation, an annular sheet metal guide mounted in said fixed housing and

partly defining a fluid flow path between said stator and said impeller said guide having an outer edge surface, and pin



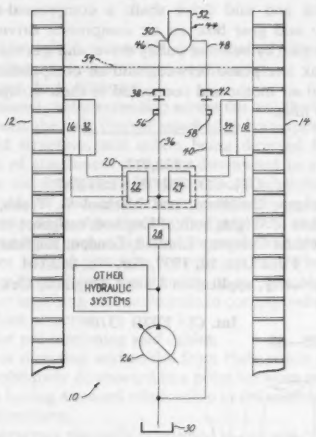
means engaging said surface and said housing and retaining said guide in said housing.

4,123,906

VEHICLE HAVING PORTABLE POWER MEANS FOR BRAKE CONTROL

Virgil R. C. Durgan, Tremont; Robert W. Harper, and Arthur J. Ritter, Jr., both of Metamora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 8, 1977, Ser. No. 804,642
Int. Cl.[2] F15B *13/09*
U.S. Cl. 60—403 **6 Claims**



1. In a vehicle having first and second spring actuated, normally locked brakes that are fluid releasable, fluid means connected to the brake for controllably, selectively passing fluid to the brakes, a first fluid power means connected to the control means through a check valve for supplying pressurized fluid through the check valve, and a fluid reservoir connected to the fluid power means, the improvement comprising:

first and second fluid couplings;

first conduit means connected to one end of the first fluid coupling with the other end being in fluid communication with the control means of each brake at a location downstream of the check valve;

second conduit means connected at one end to the second fluid coupling with the other end being in fluid communication with the reservoir; and

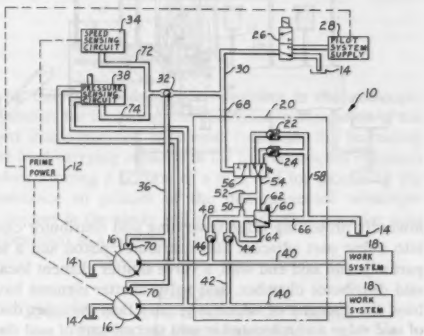
a second fluid power means, said second fluid power means being movable to and from the vehicle and releasably connectable to the first and second fluid couplings for receiving fluid from the fluid reservoir and delivering pressurized fluid to the brakes via the control means in the absence of pressurized fluid being deliverable from the first fluid power means.

4,123,907

HYDRAULIC SYSTEM HAVING SELECTIVE SIMULTANEOUS PRESSURE AND FLOW CONTROL

Donald L. Bianchetta, Coal City; Allan L. Freedy, and Sammy J. Rhodes, both of Aurora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 19, 1977, Ser. No. 788,855
Int. Cl.[2] F16H *39/46*
U.S. Cl. 60—445 **6 Claims**



1. A hydraulic control system, comprising:

variable displacement pump means driven by an associated prime power source and operatively connected for pumping power fluid to an associated work system at a relatively high output;

pressure relief valve means operable for permitting the system to operate up to a first maximum pressure mode and selectively at a second maximum allowable pressure mode higher than the first pressure mode; and

pressure control valve means operably connected to selectively supply a control pressure signal to shift the relief valve means from the first mode to the second mode and for simultaneously supplying the control pressure signal to the variable displacement pump means for reducing the relatively high output to a relatively lower output.

4,123,908

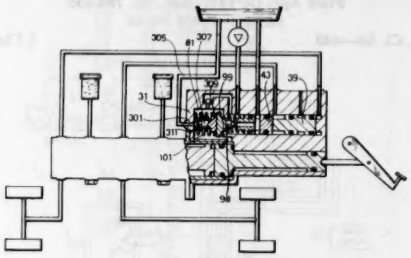
HYDRAULIC SERVO ASSISTED BRAKING SYSTEM

Antonino Bertone, Sant'Antonino (Vercelli), and Enrico Rivetti, Turin, both of Italy, assignors to FIAT Societa per Azioni, Turin, Italy

Filed Nov. 10, 1976, Ser. No. 740,463
Claims priority, application Italy, Nov. 12, 1975, 69786 A/75
Int. Cl.[2] B60T *13/12*
U.S. Cl. 60—548 **5 Claims**

1. In a servo assisted braking system for a motor vehicle of the type comprising a master cylinder operatively connected to a brake pedal, a pump for generating fluid pressure, a modulating valve located between the output of said pump and said master cylinder and having means connecting said modulating valve to said master cylinder whereby pressure generated by said pump will be applied as a servo-assisting pressure to said master cylinder, the improvement comprising said modulating valve and said master cylinder being formed as a single assembly comprising a body, two parallel bores in said body, one of said bores housing a main control piston and two subsidiary pistons of said master cylinder, said subsidiary pistons defining with the walls of said bore first and second master cylinder

chambers, the other of said bores being closed by an end plug and housing a driving piston and a distributor piston which define with the walls of the other of said bores first and second control chambers, an axial passage in said distributor piston, a transverse passage in said distributor piston communicating with said axial passage, an opening in the side wall of said body adjacent said transverse passage in said distributor piston, means connecting said first control chamber to said first master cylinder chamber, means connecting said second control chamber to said second master cylinder chamber, said distributor piston defining with the walls of said other bore and the adjacent end wall thereof a distributor chamber, an annular



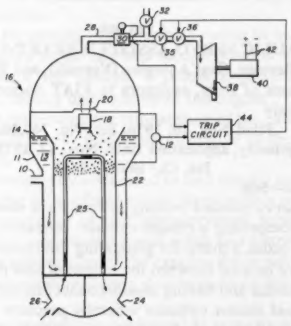
inwardly projecting ridge separating said distributor chamber into a first part adjacent said distributor piston and a second part adjacent said end wall, a valve shutter element located in said distributor chamber, said valve shutter element having a head the diameter of which is greater than the inner diameter of said ridge and is located in said second part of said distributor chamber, said valve shutter element further having a stem which extends toward and is co-axial with said axial passage in said distributor piston, an internal passageway in said body connecting said two parts of said distributor chamber and a unidirectional valve located in said passageway to permit flow only from said second part to said first part of said distributor chamber.

4,123,909

TURBINE TRIP SYSTEM

Charles T. French, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 20, 1976, Ser. No. 752,759
Int. Cl.[2] F01K *13/02*
U.S. Cl. 60—646 **6 Claims**



1. A method of protecting a turbine from liquid-water carryover, the turbine being fed by emissions from a steam generator containing water that is heated in the steam generator to produce steam, the amount of carryover being determined by at least one function of the steam-generator water level and the velocity of steam leaving the steam generator to flow to the turbine, comprising the steps of:

a. determining the values of steam-generator water level and steam velocity; and

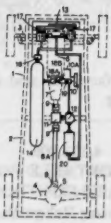
b. preventing the emissions from reaching the turbine when the value of the function as defined by the determined values of steam-generator water level and steam velocity exceeds a predetermined level.

4,123,910

AIR DRIVE ASSIST

Charles W. Ellison, Sr., 3933 Owens St., Whistler, Ala. 36612

Filed Oct. 29, 1976, Ser. No. 737,059
Int. Cl.[2] F02B *73/00*
U.S. Cl. 60—698 **3 Claims**



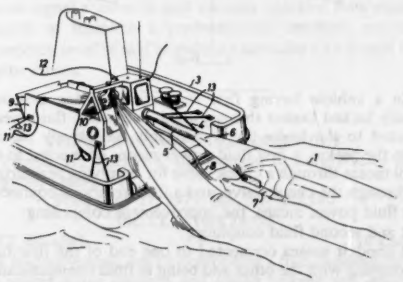
1. An automotive power system comprising in combination; a gasoline fueled internal combustion engine; a cruise-control transmission coupled to said engine; a main drive shaft; a gear box interposed between and coupled to said cruise-control transmission and said drive shaft; a compressed-air motor coupled to said gear box; an air compressor driven by said gasoline engine by belt and pulley drive; and a compressed-air storage tank interposed between said air compressor and said compressed-air motor and connected to these components by tubular air lines.

4,123,911

OIL CONTROL SYSTEM

Arthur Finigan, Guildford, and Michael G. Webb, Wootton Bridge, Isle of Wight, both of England, assignors to The British Petroleum Company Limited, London, England

Filed Oct. 14, 1977, Ser. No. 842,164
Claims priority, application United Kingdom, Oct. 20, 1976, 43513/76
Int. Cl.[2] E02B *15/04*
U.S. Cl. 405—68 **8 Claims**



1. A method for deploying an inflatable, flexible, floating barrier comprising a continuous gas-inflatable gas chamber in side by side relationship to a continuous water-inflatable water chamber from a support vessel, which comprises securing a first end of the barrier to the vessel; connecting gas inflating

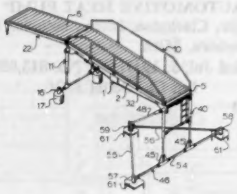
means to said first end of the gas chamber; connecting a venturi device to said first end of the water chamber; positioning the open end of said water inflatable chamber under water so that by pumping a small quantity of water into the chamber at high pressure through the venturi device thereby entrains large volumes of water from the surrounding sea into the water chamber; and discharging the barrier progressively from the vessel while inflating at least the gas chamber so that the barrier does not sink; causing relative separation between the vessel and the discharged barrier so that the latter takes up a closed curved shape away from the vessel; passing the second end of the barrier to a second support vessel or an anchoring means; moving the barrier to its desired position and maintaining the gas and water inflation of the deployed barrier.

4,123,912

LIGHTWEIGHT DEMOUNTABLE DOCK ASSEMBLY

Charles R. Meldrum, 18887 Bretton, Detroit, Mich. 48223

Filed Apr. 28, 1977, Ser. No. 791,966
Int. Cl.[2] E02B *3/20*
U.S. Cl. 405—220 **14 Claims**



1. A lightweight demountable dock assembly having a prestressed mainspan deck structure comprising:
a mainspan deck structure;
pre-tensioned cables extending across the length of said deck structure, the ends thereof attached to corresponding ends of said structure, said cables being directed from their points of attachment obliquely downward to a point between said attachments having a spaced relationship to the underside of said deck structure whereby a lightweight mainspan deck structure may be provided as a result of said pre-tensioning of said cables producing bending prestresses in said structure in opposition to the bending stresses from normal loads acting on top of said structure;
means for attaching said cable ends to corresponding ends of said deck structure;
means for pre-tensioning said cables;
means for directing said cables from their points of attachment obliquely downward to a point between said attachments having a spaced relationship to the underside of said deck structure;
a ramp structure pivotally connected to one end of said deck structure; and
means for supporting the ends of said deck structure.

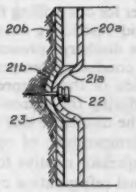
4,123,913

MECHANISMS FOR INTERCONNECTING TWO CYLINDERS UNDERGROUND

Ivo C. Pogonowski, Blacksburg, Va., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 644,367, Dec. 24, 1975, Pat. No. 4,064,703. This application Jan. 28, 1977, Ser. No. 763,392
Int. Cl.[2] E02D *5/44*
U.S. Cl. 405—244 **10 Claims**

1. A mechanism for interconnecting two cylinders having telescoped cylindrical walls buried in a sandy soil strata and other granular soils comprising,
(a) a plurality of headed spike means for being driven radially outwardly for forming a plurality of outwardly extending bumps in a horizontal plane around the periphery of the telescoped cylindrical walls,
(b) said outwardly extending bumps being means for packing the sandy soil strata around said bump means, and
(c) each spike means penetrating each bump means as said spike means is pressed outwardly further after forming said bump means to lodge in said packed sandy soil strata



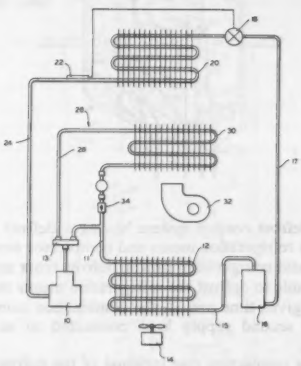
with only said spike heads remaining in the telescopic cylinders for increasing the resistance to separation of the two interconnected telescopic cylinders, for increasing the load-carrying capacity of the interconnected cylinders when forming a portion of a pile, and for increasing the resistance to pullout of the interconnected telescopic cylinders in the sandy soil strata and other granular soils when used as a portion of a pile.

4,123,914

ENERGY SAVING CHANGE OF PHASE REFRIGERATION SYSTEM

Arthur Perez, and Edward E. Bowman, both of Niles, Mich., assignors to Tyler Refrigeration Corporation, Niles, Mich.

Continuation of Ser. No. 592,573, Jul. 2, 1975, abandoned. This application Jan. 28, 1977, Ser. No. 763,503
Int. Cl.[2] F25B *41/00, 27/02, 39/02*
U.S. Cl. 62—196 B **40 Claims**



1. An improved change of phase refrigeration system having a closed refrigeration circuit, comprising: a compressor; a condenser; a liquid refrigerant receiver; evaporating means; hot gas supply conduit means coupled between the discharge side of the compressor and the condenser; first liquid refrigerant supply conduit means coupled between the condenser and the receiver; second liquid refrigerant supply conduit means coupled between the receiver and the evaporating means; third conduit means coupled between the evaporating means and compressor to complete a circulation circuit for movement of refrigerant through the refrigeration system; metering means interposed in said second liquid refrigerant supply conduit means for controlling the flow of refrigerant to the evaporating means in accordance with the requirements of the evapo-

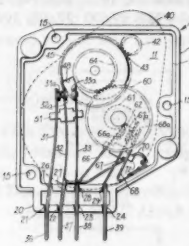
rating means; sensor means controlling said metering means responsive to the condition of refrigerant in said conduit means; valve means interposed between said evaporating means and said compressor for selectively directing refrigerant flow in a forward direction from said evaporating means to the suction side of the compressor or in a reverse direction from the discharge side of the compressor through said evaporating means during refrigeration and defrost cycles, respectively; restricting means interposed in said closed circuit between the compressor and receiver for controlling the discharge pressure of the compressor, said restricting means being selectively actuable to increase the discharge pressure of the compressor to thereby increase the condensate temperature of the refrigerant at the discharge side of the compressor, said restricting means being actuable during the defrost cycle to restrict the flow of refrigerant at the discharge side of the compressor to thereby increase the temperature of refrigerant at the discharge side of the compressor relative to the refrigerant temperature during a normal refrigeration cycle; a heat recovery coil provided between the compressor and the condensor; means for carrying away the heat generated by the heat recovery coils; and controlled valve means for selectively directing compressor discharge refrigerant to the condenser or to the heat recovery coil; and wherein said restricting means may be controlled to restrict the flow of the compressor discharge refrigerant from the heat recovery coil until the pressure of the discharge refrigerant reaches a desired higher pressure level.

4,123,915

DEFROST TIMER HAVING SELECTABLE DEFROST TIME

Jon D. Stoor, Manitowoc, Wis., assignor to AMF Incorporated, White Plains, N.Y.

Filed May 16, 1977, Ser. No. 797,280
Int. Cl.[2] F25D *21/08*; H01H *7/08*
U.S. Cl. 62—234 **17 Claims**



1. In a defrost control system having a defrost heater for defrosting a refrigeration means and compressor means for use in cooling said refrigeration means, defrost timer means selectively operable to defrost the refrigeration means one or more times each given time period, the combination comprising

first and second supply lines connected to an electrical source,

means for connecting one terminal of the defrost heater to the first supply line,

means for connecting one terminal of the compressor means to said first supply line,

a defrost timer device having at least four terminals,

first and second switch means included in said defrost timer device and each being operable between first and second switch positions,

first and second rotatable cam means each associated with a respective switch means for operating the respective switch means from its first to its second switch position when a given part of the cam is at a respective predetermined angular position,

means for rotating the two cam means a respective number of times each given time period to cause the respective given parts of the two cams to simultaneously arrive at their predetermined angular position only once each given time period,

means interconnecting the two switch means for providing a series conduction path therethrough between the first and fourth terminals of the defrost timer when both switch means are in their second switch positions,

means including a selectable switching means which in one switching position provides a series conduction path from the other supply line through the fourth terminal of the defrost timer and through the second switch means in its first switch position to the other terminal of the compressor, and when in its other switching position provides a series conduction path from the other supply line through the third terminal of the defrost timer and through the first switch means in its second switch position to the other terminal of the defrost heater, and

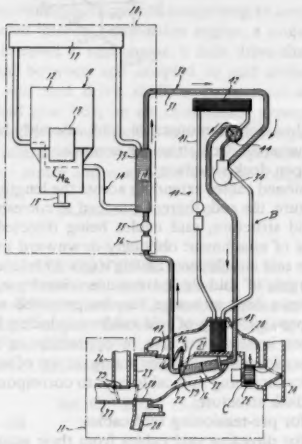
means for connecting said other supply line to the other terminal of the compressor means when the selectable switching means is in its other switching position and the first switch means is in its first switch position.

4,123,916

AUTOMOTIVE HEAT PUMP

Thomas C. Kreger, Clarkston, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jul. 5, 1977, Ser. No. 813,058
Int. Cl.[2] B60H *3/04*
U.S. Cl. 62—243 **8 Claims**



1. In a vehicle powered by an engine having a cooling system with its own independent radiator exposed to ambient air flow and regulated to a maximum cooling system fluid temperature less than 70° F. when ambient temperature conditions are 40° F. or lower, an air conditioning system for the passenger compartment of said vehicle which system is effective to both heat and cool said compartment selectively comprising:

(a) a first closed refrigerant circuit having an evaporator in heat absorbing relationship with said cooling system and having a condenser exposed to air flowing through said passenger compartment, said first closed refrigerant circuit being effective to utilize the heat carried by said engine cooling system as the source of heat for the heating mode of the air conditioning system,

(b) a second closed refrigerant circuit having an evaporator exposed to air flowing through said vehicle compartment and a condenser exposed to ambient air, the second closed refrigerant circuit utilizing the heat within the passenger compartment as a source of heat for extraction and thereby cooling of said air,

(c) a compressor driven by said engine common to each of said circuits for pressurizing the refrigerant for conveyance to either of said condensers, and

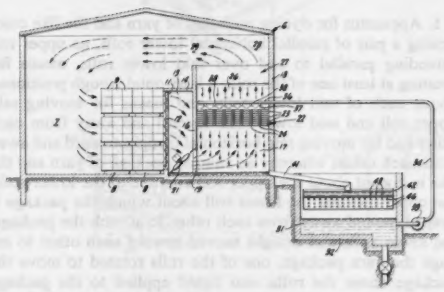
(d) control means for selectively connection said compressor with either of said circuits whereby said first circuit may operate as the heating mode of said vehicle conditioning system in which the refrigerant absorbs heat from said engine cooling system while at a low pressure and then is elevated in pressure as well as temperature above 150° F. by said compressor so that heat can be released to the air flowing through said vehicle compartment which is at a temperature of at least 120° F. lower than said pressurized refrigerant resulting in condensation of the refrigerant.

4,123,917

PRODUCE COOLER

Richard E. Curtis, Pleasanton; Robert H. Dench, Monte Sereno, and Victor J. Dervin, Cupertino, all of Calif., assignors to NPI Corporation, Burlingame, Calif.

Filed Aug. 10, 1977, Ser. No. 823,394
Int. Cl.[2] F25D *17/04;* F26B *7/00*
U.S. Cl. 62—309 **4 Claims**



1. A produce cooler comprising an enclosure for produce; a vertically extending cooling compartment; a horizontally extending heat exchanger extending across said cooling compartment above the bottom thereof and below the top thereof; a demister extending across said cooling compartment below the top thereof and disposed above said heat exchanger to leave an intervening chamber; means for circulating air from produce in said enclosure into said cooling compartment adjacent the bottom thereof, then upwardly therein through said heat exchanger, through said chamber and said demister, and from said cooling compartment adjacent the top thereof back to said produce in said enclosure; a cooling water spray device disposed in said chamber and directed to discharge downwardly over and through said heat exchanger and onto the floor of said compartment; a sump; a cooling coil in said sump; means for conducting water from the floor of said compartment to discharge over said cooling coil into said sump; and a pump connected to withdraw water from said sump and supply said water to said cooling water spray for recirculation.

4,123,918

ICE DISPENSING MACHINE

Vance L. Kohl, and Walter H. Hoenisch, both of Albert Lea, Minn., assignors to King-Seeley Thermos Co., Ann Arbor, Mich.

Filed Dec. 9, 1976, Ser. No. 749,036
Int. Cl.[2] B67D *5/62;* F25C *5/18*
U.S. Cl. 62—320 **59 Claims**

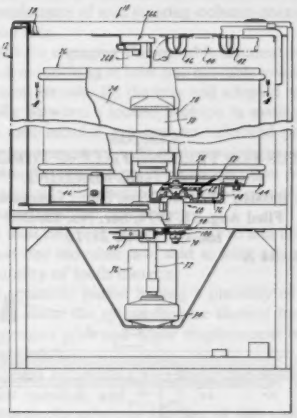
1. A material dispensing apparatus comprising

a material storage section,

a material discharge section including means defining a discharge path for communicating material toward a delivery area,

a discharge member having at least one material moving element mounted thereon for causing material within said discharge section to be dispensed from the apparatus,

said material moving element being mounted on said discharge member for movement between a first position for



moving material toward said discharge path and a second position for causing material to move along said path toward said delivery area, and

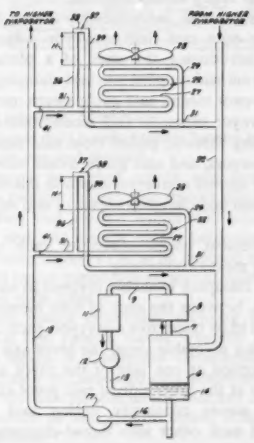
means for rotatably supporting said material storage section and said discharge member upon parallel axes.

4,123,919

REFRIGERATION FEED SYSTEM

Gustav James Fehlhaber, Burlingame, Calif., assignor to NPI Corporation, Burlingame, Calif.

Filed Jul. 25, 1977, Ser. No. 818,844
Int. Cl.[2] F25B *43/00*
U.S. Cl. 62—503 **3 Claims**



1. A refrigeration feed system comprising an accumulator adapted to contain liquid in its lower portion and gas in its upper portion, a plurality of evaporators each disposed at a different elevation, a pump, means for connecting the inlet of said pump to the lower portion of said accumulator, pipe means for connecting the outlet of said pump to the inlet of each of said evaporators, means for connecting the outlet of each of said evaporators to the upper portion of said accumula-

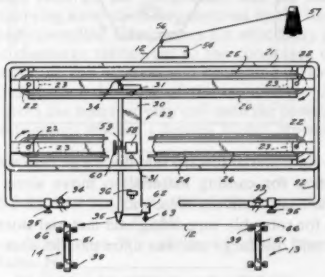
tor, and a plurality of weirs incorporated in said pipe means one for each of said evaporators, each of said weirs being disposed at an elevation substantially above the top of its respective evaporator.

4,123,920

APPARATUS FOR FEEDING FILLING THREADS TO A WARP KNITTING MACHINE

Rudolph G. Bassist, 1003 McGrann Blvd., Lancaster, Pa. 17601

Filed Aug. 31, 1977, Ser. No. 829,309
Int. Cl.[2] D04B *23/12*
U.S. Cl. 66—84 A **8 Claims**



1. In an apparatus for feeding filling threads to a wrap knitting machine comprising:

first and second spaced apart conveyor means extending toward the knitting instrumentalities of the machine,

a plurality of thread clamping means carried by and movable with each of said conveyor means,

a plurality of filling thread supplies,

guide means movable, independently of said thread supplies, crosswise over said first conveyor means for simultaneously introducing the ends of a plurality of filling threads from said supplies into said clamping means of said first conveyor means, said guide means moving from said first conveyor means to said second conveyor means to draw filling threads, pulled from said supplies, between said conveyors, and said guide means moving crosswise over said second conveyor means to introduce the filling threads into said clamping means of said second conveyor means.

the improvement characterized by each of said thread clamping means comprising:

a pair of clamping members pivoted to each other about an axis, between the ends of both members, fixed with respect to its respective conveyor, each clamping member being pivotable about the pivot axis and having an arm portion at one side of the pivot axis and a foot portion at the other side of said pivot axis,

resilient means constantly urging said arm portions toward each other into thread-clamping relationship, and

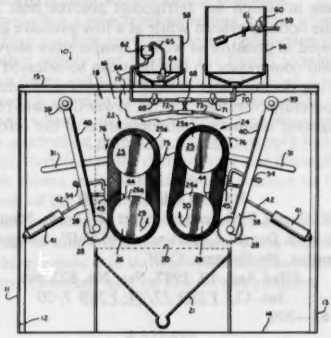
actuating means for simultaneously operating a plurality of said clamping means carried by each conveyor, said actuating means engaging both foot portions of each clamping means to pivot each of said arm portions away from the other against the force of said resilient means and open said clamping means, said actuating means thereafter permitting said resilient means to close said clamping means.

4,123,921

DYEING SYSTEM

James H. Eakes, P.O. Box 609, Cartersville, Ga. 30120

Filed Aug. 19, 1977, Ser. No. 825,942
Int. Cl.[2] D06B *1/08*
U.S. Cl. 68—22 R **10 Claims**



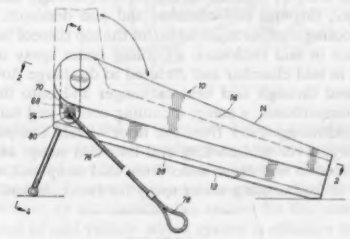
1. Apparatus for dyeing packages of yarn and the like comprising a pair of parallel horizontal lower rolls, an upper roll extending parallel to and over said lower rolls, means for rotating at least one of the rolls, a horizontal trough positioned above each of said lower rolls, and means for moving said upper roll and said lower rolls toward and away from each other and for moving said horizontal troughs toward and away from each other, whereby an annular package of yarn and the like is draped about the upper roll and one of the lower rolls, the upper roll and the lower roll about which the package is draped moved away from each other to stretch the package, the lower rolls and troughs moved toward each other to engage the yarn package, one of the rolls rotated to move the package about the rolls, and liquid applied to the package through the troughs.

4,123,922

LOCKABLE DESK RECEPTACLE

Paul G. Kuenstler, 6519 Mapleridge, Houston, Tex. 77081

Filed Oct. 1, 1976, Ser. No. 728,954
Int. Cl.[2] E05B *73/00*
U.S. Cl. 70—58 **13 Claims**



1. A receptacle for lockably and releasably retaining an article therein, said receptacle comprising:

wall structure defining a depression within which said article is receivable;

locking means establishing an interlocking relation with said receptacle and for establishing an interlocking relationship with an article for securing said article against separation from said receptacle, said receptacle defining an open portion to expose said article for use when so secured within said receptacle;

keeper means being releasably positionable in cooperative relationship with said wall structure and said locking

means in the locked position of said locking means, said keeper means retaining said locking means in said locked position; and

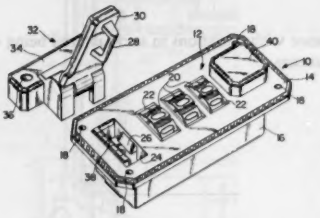
retainer means for securing said keeper means in said cooperative relationship with said wall structure.

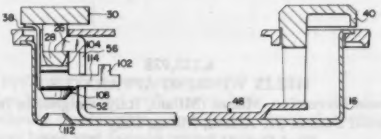
4,123,923

COMBINATION LOCK

Lazlo Bako, Woodcliff Lake, N.J., assignor to Presto Lock Company, division of Walter Kiddie & Company, Inc., Garfield, N.J.

Filed Nov. 29, 1977, Ser. No. 855,602
Int. Cl.[2] E05B *37/02, 65/48*
U.S. Cl. 70—74 **13 Claims**





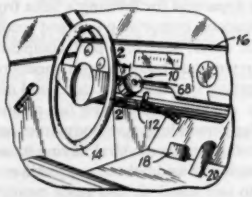
1. A combination lock comprising actuator means movable in a predetermined direction from a rest position to an unlocking position, only when the lock is on-combination, to unlock the lock, and further movable in said predetermined direction beyond the unlocking position to a combination-changing position to permit the combination to be changed, stop means normally effective to prevent movement of the actuator means to the combination-changing position, and manually operable means for rendering the stop means ineffective.

4,123,924

IGNITION SWITCH LOCK

Ronald Dworkis, 14-12 Chandler Dr., Fairlawn, N.J. 07410

Filed Apr. 29, 1977, Ser. No. 792,141
Int. Cl.[2] E05B *17/14*
U.S. Cl. 70—237 **3 Claims**



1. An ignition switch lock for securement to an ignition switch mounted on the steering column of a vehicle; said steering column being substantially cylindrical in shape and having a first axis, and said ignition switch having a stationary segment fixed to said steering column and a movable segment rotatable with respect to said stationary segment about a second axis substantially perpendicular to said first axis and spaced from said stationary segment to define an annular gap therebetween; said ignition switch lock comprising

(a) a substantially cylindrical housing having one end surface shaped to mate with and conform to the contours of the circumference of said steering column coaxially with said second axis,

(b) means for engaging the movable segment of said ignition switch comprising at least one movable jaw having at least one semi-circular lip thereon and adapted to move reciprocally between a locked position in mating engagement with said annular gap and an unlocked position out of mating engagement with said annular gap, and

(c) means for controlling the reciprocation of said at least one movable jaw between said locked position and said unlocked position comprising

(i) at least one rack corresponding to and linked to said at least one movable jaw, said at least one rack having a plurality of teeth thereon,

(ii) a rotatable pinion having a plurality of teeth distributed about the circumference thereof for meshing engagement with and linear displacement of said at least one rack,

(iii) means for guiding said linear displacement of said at least one rack, and

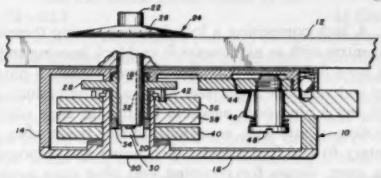
(iv) means for selective rotation of said pinion.

4,123,925

PUNCH-THRU LOCK ASSEMBLY

Joseph F. Nemec, Jr., Southington, Conn., assignor to Federal, Inc., Southington, Conn.

Filed Oct. 25, 1977, Ser. No. 844,537
Int. Cl.[2] E05B *15/16*
U.S. Cl. 70—329 **15 Claims**



1. A lock assembly comprising:

housing means, said housing means having an access opening in at least one end thereof;

spindle means supported within said housing means for rotation relative thereto, said spindle means having an axis and a first end located within said housing means, the second end said spindle means projecting outwardly of said housing means so as to be exposed to view;

cam wheel means supported on said spindle means intermediate the ends thereof;

spindle key means detachably securing said cam wheel means to said spindle means whereby rotation of said spindle means is transmitted therethrough to said cam wheel means to cause said cam wheel means to rotate in unison with said spindle means, said key means permitting axial motion of said spindle means relative to said cam wheel means;

tumbler means cooperatively associated with said cam wheel means, said tumbler means being movable in response to rotation of said cam wheel means between a first position corresponding to the locked condition of the lock assembly and a second position corresponding to the unlocked condition of the lock assembly;

lock bolt means cooperatively associated with said cam wheel means and said tumbler means, said lock bolt means being movable between a first position when said tumbler

means is in said first position thereof wherein said lock bolt means is operative to effect the establishment of the locked condition of the lock assembly and a second position when said tumbler means is in said second position thereof wherein said lock bolt means is operative to effect the establishment of the unlocked condition of the lock assembly; and

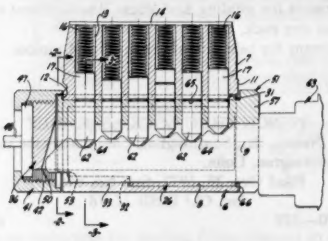
cover means secured to said housing so as to at least in part cover said access opening, said cover means having a weakened portion axially aligned with said spindle means, said spindle means first end breaking through said weakened portion when said spindle means is forcibly driven axially into housing means.

4,123,926

REMOVABLE CORE CYLINDER LOCK

George Elder, Woodside, Calif., assignor to Schlage Lock Company, San Francisco, Calif.

Filed Jul. 5, 1977, Ser. No. 813,164
Int. Cl.[2] E05B *9/04, 27/04*
U.S. Cl. 70—369 **24 Claims**



1. A lock comprising a lock housing having therein a bore concentric with an axis, means in said lock housing and open to said bore including a first tumbler mechanism, a plug in said bore and rotatable about said axis, said plug including a plug shell and a plug core movable relative to each other in the direction of said axis, a second tumbler mechanism complementary to said first tumbler mechanism and disposed in said plug core, means for retaining said plug core against axial removal from said housing except in one rotated position of said plug core relative to said housing, said retaining means including an inturned flange on said housing extending toward said bore, means defining an axial window in said flange, and said retaining means including a lug on said plug core adapted to rotate against said flange and to pass axially through said window.

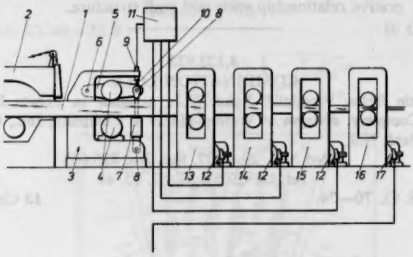
4,123,927

ROLLING MILL

Hans Brauer, Leichlingen, Fed. Rep. of Germany, assignor to Friedrich Kocks GmbH & Co., Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 705,293, Jul. 14, 1976, abandoned. This application Oct. 3, 1977, Ser. No. 839,009
Int. Cl.[2] B21B *37/02*
U.S. Cl. 72—16 **6 Claims**

5. In combination a feeder for a roughing rolling mill for wire, bars, profiles and the like, said feeder having drive means engaging said wire, bars, profiles and the like for advancing the same through the feeder, said drive means being variable for varying cross-sections of material being driven, measuring means on said feeder measuring the variation in said drive means, a plurality of successive roughing mill stands having forming rolls forming a pass line receiving material from said feeder to shape the same, variable drive means for each stand of said pass line receiving material from the feeder except at least the last pass and control means between said measuring means and said variable drive means varying said drive means



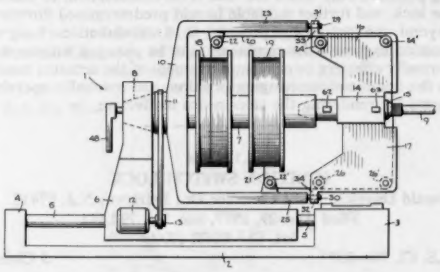
in accordance with variations in said material being driven by the drive means.

4,123,928

HELIX WINDING APPARATUS

Antonio Ferrentino, Monza (Milan), Italy, assignor to Industrie Pirelli Societa per Azioni, Milan, Italy

Filed Oct. 31, 1977, Ser. No. 846,906
Claims priority, application Italy, Nov. 5, 1976, 29041 A/76
Int. Cl.[2] B21F *3/04*
U.S. Cl. 72—66 **10 Claims**

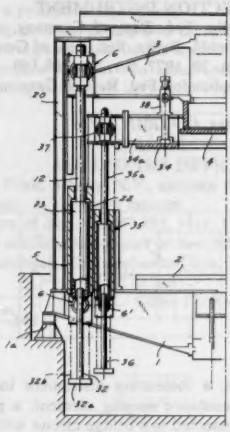


1. Winding apparatus for forming a helix from an elongated body, said apparatus comprising first and second parts separable from each other, said first part comprising at least one bobbin for carrying said body thereon, means rotatably mounting and supporting said bobbin, a cage, and means supporting and rotatably mounting said cage for rotation around said bobbin and for unwinding said body from said bobbin, said second part comprising a mandrel having its axis aligned with the axis of rotation of said bobbin and guide means for guiding said body onto said mandrel, said guide means being rotatably mounted and releasably connected for rotation with said cage when said parts are unseparated, and said apparatus further comprising gripping means for alternately gripping and holding and releasing said mandrel and said guide means, and means mounting said gripping means and said first part for relative movement in the direction of said axis of said mandrel for separating said first part from said second part.

4,123,929
HYDRAULIC PRESS

Eduard J. C. Huydts, Düsseldorf-Gerresheim, Germany, assignor to G. Siempelkamp GmbH & Co., Krefeld, Germany

Filed Jun. 3, 1977, Ser. No. 803,314
Claims priority, application Fed. Rep. of Germany, Jun. 5, 1976, 2625482
Int. Cl.[2] B21D *7/06*
U.S. Cl. 72—453.08 12 Claims



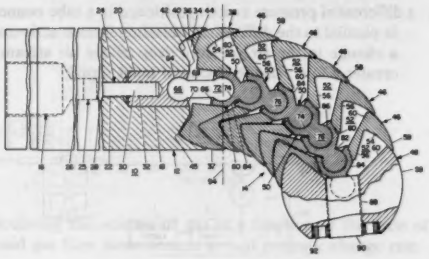
1. A hydraulic press comprising:
a lower beam formed with a press bed;
a vertically displaceable upper beam disposed above said lower beam and formed with a ram;
a plurality of columns connecting said lower beam and said upper beam and formed as respective piston-and-cylinger arrangements for displacing said upper beam relative to said lower beam;
and a transverse bearing connecting the upper end of each of said columns with an end of said upper beam and a lower end of each of said columns with an end of said lower beam whereby said upper beam can cant without applying bending moments to said piston-and-cylinder arrangement.

4,123,930
MANDREL FOR BENDING TUBES

Ernest W. Hill, Aurora; Dale E. Maier, and Melvin R. Humphrey, both of Evergreen, all of Colo., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 782,539, Mar. 29, 1977, abandoned. This application Nov. 21, 1977, Ser. No. 853,294
Int. Cl.[2] B21D *9/03*
U.S. Cl. 72—466 8 Claims

1. Tube bending mandrel having a flexible link section comprising:
a series of rigid link members flexibly interconnected in end-to-end relation, each of the link members having a spherically curved ball at one end and a cylindrical body portion with a corresponding spherically curved socket at the other end, the centers of curvature of the ball end and the socket end being spaced apart by a predetermined distance; and
a corresponding series of ball members fitting on and slideable over the cylindrical body portions of the link members, each ball member having inner and outer spherically curved surfaces with centers of curvature spaced apart by the said predetermined distance, the outer spherically curved surface of each ball member nesting slideably within the inner spherically curved surface of the preceding ball member and the inner spherically curved surface of each ball member fitting slideably over the outer spherical surface of the succeeding ball member in the series, each ball member being positioned on the cylindrical body of its corresponding link member with the center of curvature of its outer spherical surface substantially coincident with the center of curvature of the spherically curved socket of the link and with the center of curvature of the spherically curved ball end of the preceding link member positioned therein.



4,123,931
METHOD FOR UNIFORMLY COATING LIQUID PHASES ON GLASS BEADS AND APPLICATIONS THEREOF

Wayne W. Blaser, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 711,196, Aug. 3, 1976, abandoned. This application Sep. 19, 1977, Ser. No. 834,627
Int. Cl.[2] B01D *15/08*; G01N *31/08*
U.S. Cl. 73—23.1 13 Claims

1. In the method of separating a plurality of chromatographically reactive species wherein a gas containing a plurality of said species is passed through a bed comprising a solid support, said support having a liquid phase thereon, the improvement which comprises: employing as said bed, glass beads which have been treated by the method comprising the steps of contacting the beads with a first solution containing a nonionic, polymeric surfactant, or a mixture of nonionic, polymeric surfactants of alkylene oxide repeating units of 2 or 3 carbon atoms, to promote the uniform deposition on the beads of the desired liquid phase, and being characterized by resistance to bleed at a temperature of at least 200° C., then contacting the beads with a second solution containing a stationary liquid phase under conditions selected so that a coating of said stationary liquid phase of from about 0.05 to about 0.5 percent is imparted to said beads.

4,123,932
DOSIMETER FOR MONITORING WORKING AREAS

William B. Baker, Newark, and Donald G. Clark, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

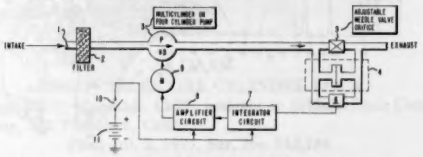
Filed May 25, 1977, Ser. No. 800,430
Int. Cl.[2] G01N *1/24*
U.S. Cl. 73—28 11 Claims

1. An improved dosimeter that has an electric motor, a power source, an exhaust port and a filter means in which particles or vapors present in an air stream being pumped through the dosimeter at a controlled constant flow rate are collected on the filter means; the improvement in use therewith comprises
a variable drive multicylinder pump, tubularly connected to the filter means and coupled to the electric motor, draws the air stream through the filter means;
an orifice being positioned in a tube attached to the pump

and to an exhaust port, wherein the air stream is pumped through the orifice and thereby creates an air pressure drop;

a differential pulsation pressure filter position in a tube connected to the exhaust port and in parallel with the orifice and reduces pulsations in the air stream;

a differential pressure switch positioned in a tube connected in parallel to the differential pulsation filter is activated by a change in the air pressure drop of the air stream and creates a low voltage electrical input signal;



an integrator circuit electrically connected to a power source and to the pressure switch uses the low voltage input signal generated by the pressure switch and integrates this signal;

an amplifier circuit electrically connected to the power source and connected in series to the integrator circuit and to the electric motor which amplifies the signal generated by the integrator circuit and feeds the amplified signal to the electric motor thereby controlling the speed of the motor driving the pump in relationship to the signal generated by the pressure switch to maintain the air stream at a controlled constant flow rate.

4,123,933

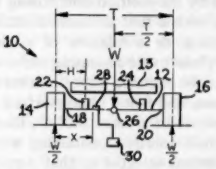
METHOD FOR MEASURING AXLE DEFLECTION

Paul A. Reid, Mentor, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Jan. 27, 1978, Ser. No. 873,044

Int. Cl.[2] G01B 7/18; G01G 19/12

U.S. Cl. 73—855 **5 Claims**



1. In a method for sensing a change in deflection of a pivotal axle due to laod, said axle having first and second ends and being connected to a frame, said first and second ends being connected to first and second wheels, respectively, with the pivotal movement of said axle toward the frame being limited by a stop member connected to one of the axle and frame, the improvement comprising:

attaching a deflection sensing means to a preselected side of the axle about a preselected longitudinal location relative to the length of the axle, said preselected location being defined by the equation:

$$X = 2TH/2H+T$$

wherein x = the longitudinal location at which the axle deflection is substantially independent of the force exerted by the stop member on the axle measured inwardly from the center of one of the wheels,

T = the distance between the centers of the wheels, and

H = the distance between the first wheel center and the center of the stop member; and

connecting an indicating device to the deflection sensing means.

4,123,934

BRIDGE CIRCUIT ARRANGEMENT FOR A GAS DETECTION INSTRUMENT

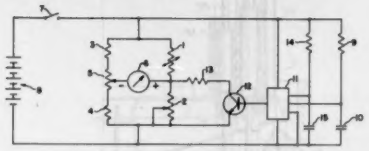
Wolfgang Höht, Berlin, Fed. Rep. of Germany, assignor to Auergesellschaft GmbH, Berlin, Fed. Rep. of Germany

Filed Jun. 20, 1977, Ser. No. 808,140

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1976, 2627916

Int. Cl.[2] G01N 27/18

U.S. Cl. 73—27 R **1 Claim**



1. In combination, a measuring instrument including an electrically-heated resistance sensing element, a plurality of constant resistors connected in a bridge circuit with said sensing element, the bridge circuit including means for measuring change in resistance of said sensing element, a transistor connected across one of said resistors, and control means for said transistor operative upon energization of the sensing element to make the transistor conductive for short-circuiting a portion of the bridge circuit and including time delay means to cause the transistor to revert to the non-conductive state after a predetermined time period to remove the short circuit, said control means comprising a toggle type flip-flop having a resistor-capacitor network to control the time of switching from one state to the other.

4,123,935

TESTING METHOD FOR A RECIPROCATING INTERNAL COMBUSTION ENGINE

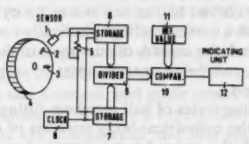
Albert Maringer, Karlsruhe, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Jul. 22, 1977, Ser. No. 818,063

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1976, 2633908

Int. Cl.[2] G01M 15/00

U.S. Cl. 73—116 **4 Claims**



1. A method for testing reciprocal internal combustion en-

gines using an angular velocity measurement about top dead center comprising:

(a) measuring the time to traverse an angular range of approximately 32° about top dead center, which time will be inversely proportional to the angular velocity over said angular range of approximately 32° about top dead center;

(b) measuring the time required for an entire revolution, which time will be inversely proportional to the angular velocity for an entire revolution, both of said values being determined with the engine running under its own power and at a predetermined speed;

(c) finding the ratio of said two times; and

(d) comparing said ratio with a similar ratio present for the same engine type at the same speed with the engine functioning perfectly.

4,123,936

VOLUMETER DEVICE

William H. Peak, Albany, N.Y., assignor to Donald P. Matula, Schenectady, N.Y., a part interest

Continuation of Ser. No. 667,491, Mar. 17, 1976, abandoned, which is a continuation-in-part of Ser. No. 460,567, Apr. 12, 1974, abandoned. This application Feb. 18, 1977, Ser. No. 770,206

Int. Cl.² G01F *17/00*

U.S. Cl. 73—149 **7 Claims**

1. A volumeter apparatus, comprising

(a) a hollow main body portion comprising an open end, a second end which is closed and at least a wall portion that is one of substantially transparent and substantially translucent, said wall portion comprising at least one scale adapted to provide a direct reading of the volume of the cavity to be measured;

(b) a mouth portion disposed at said open end;

(c) a valve means disposed between said main body portion and said mouth portion for controlling material flow therebetween; and

(d) said one scale having values decreasing in magnitude in the direction toward said mouth portion.

4,123,937

METHODS OF DETERMINING WELL CHARACTERISTICS

Lloyd G. Alexander, 1314 Klondyke Ave. SW., Calgary, Alberta, Canada

Continuation-in-part of Ser. No. 801,743, May 31, 1977, abandoned. This application Sep. 27, 1977, Ser. No. 837,229

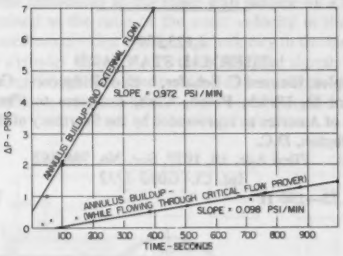
Int. Cl.² E21B *47/06*

U.S. Cl. 73—155 **15 Claims**

1. A method of determining the volume of gas in a well annulus below the wellhead comprising the steps of:

measuring the rate of gas flow in the annulus while a path for emerging gas is open through the wellhead;

closing the wellhead gas path and measuring the change of pressure in the annulus over a predetermined interval of time to determine the pressure change rate; and


ANNULUS BUILDUP - NO EXTERNAL FLOW
SLOPE = 0.972 PSI/MIN
ANNULUS BUILDUP - WHILE FLOWING THROUGH CRITICAL FLOW PROVER
SLOPE = 0.098 PSI/MIN
ΔP - PSIG
TIME - SECONDS

calculating the volume of gas as a function of the ratio of said gas flow measurement to said pressure change rate.

4,123,938

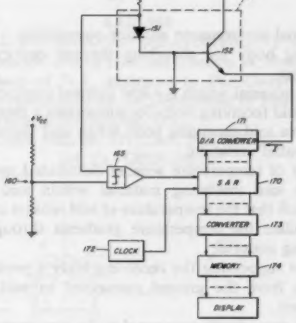
DEVICE FOR MEASURING THERMAL PARAMETERS

Douglas J. Hamilton, Tucson, Ariz., assignor to University Patents, Inc., Stamford, Conn.

Filed May 19, 1976, Ser. No. 687,895

Int. Cl.² G01K *17/00*

U.S. Cl. 73—190 H **1 Claim**



1. Apparatus for measuring the temperature of an environment, comprising:

a semiconductor substrate;

an insulator surrounding the substrate and separating the substrate from the environment;

temperature sensing means formed in said substrate for generating a first electrical signal as a function of the temperature of said substrate;

means for generating a reference level;

a comparator responsive to said first electrical signal and said reference level for generating a control signal indicative of whether or not said first electrical signal exceeds said reference level;

a successive approximation register responsive to said control signal;

digital to analog converter means for converting the contents of said successive approximation register to an analog signal;

heater means formed in said substrate;

means for electrically driving said heater means in response to said analog signal; and

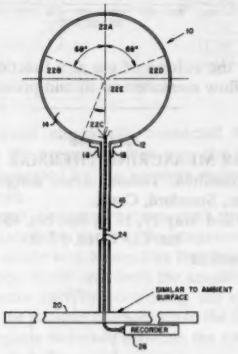
means for displaying the contents of said successive approximation register;

the displayed value being indicative of the rate of heat flow through the insulator, and therefore indicative of the temperature of the ambient environment.

4,123,939
THERMAL STANDARD

Crill Maples; Howard C. Schafer, both of Ridgecrest, Calif., and Richard D. Ulrich, Provo, Utah, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 19, 1977, Ser. No. 788,862
Int. Cl.[2] G01J 5/12
U.S. Cl. 73—190 H **7 Claims**



1. A thermal environment monitor comprising:
a receiving body for absorbing thermal energy from all directions;
insulating material which is a low thermal conductor placed within said receiving body for supporting a thermal gradient across said receiving body when said thermal energy has a spatial variation;
a plurality of temperature sensors distributed over and/or through said insulating material within said receiving body such that the temperature at said sensors can be used to calculate the temperature gradients throughout said insulating material;
a stand for supporting the receiving body a predetermined distance from the ground connected to said receiving body; and
a recorder operatively connected to the temperature sensors for logging the temperatures observed at each sensor over a period of time, whereby calculations of the temperature gradient as a function of time can be made.

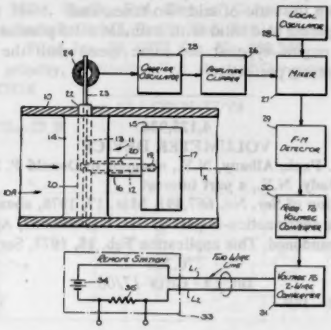
4,123,940
TRANSMISSION SYSTEM FOR VORTEX-SHEDDING FLOWMETER

Peter J. Herzl, Morrisville, and Robert G. Shaffer, New Britain, both of Pa., assignors to Fischer & Porter Company, Warminster, Pa.

Filed Sep. 23, 1977, Ser. No. 836,150
Int. Cl.[2] G01F 1/32
U.S. Cl. 73—194 VS **14 Claims**

1. A transmission system operable in conjunction with a flowmeter which generates fluidic oscillations whose frequency is an index to the flow rate of the fluid being metered, said system comprising:

A. a sensor responsive to said fluidic oscillations, said sensor being constituted by a resonator element included in the frequency-determining circuit of a carrier oscillator, said oscillator having a predetermined center frequency in the absence of said fluidic oscillations whereby the frequency of the carrier is caused to deviate from its center frequency at a rate which depends on the frequency of the oscillations and to an extent that depends on the amplitude of the oscillations to produce a frequency-modulated carrier, said flowmeter being of the vortex-shedding type and having a deflectable member which is caused by said fluidic oscillations to vibrate at the same frequency, said sensor being operatively coupled to said deflectable member to vary the value of said resonator element accordingly, said deflectable element being only slightly deflectable, whereby the percentage change in the frequency-modulated carrier is relatively small;



B. a stable oscillator producing local oscillations whose frequency is close to that of said center frequency;

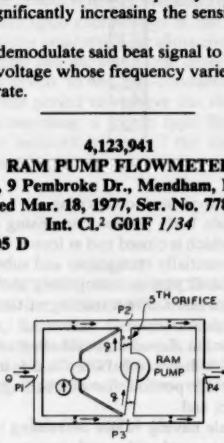
C. means to mix said local oscillations with said frequency-modulated carrier to produce a frequency-modulated negative beat signal whose percentage change is much greater than that of said frequency-modulated carrier, thereby significantly increasing the sensitivity of the system; and

D. means to demodulate said beat signal to derive therefrom an output voltage whose frequency varies as a function of said flow rate.

4,123,941
RAM PUMP FLOWMETER

Walter Masnik, 9 Pembroke Dr., Mendham, N.J. 07945

Filed Mar. 18, 1977, Ser. No. 778,930
Int. Cl.[2] G01F 1/34
U.S. Cl. 73—205 D **6 Claims**



1. A mass flowmeter adapted to measure the mass flow rate of an effectively incompressible liquid passing there through comprising inlet and outlet conduits having a flow which is to be measured, first and second branch conduits connecting said inlet and outlet conduits, first and second flow restrictors in said first branch conduit, third and fourth flow restrictors in said second branch conduit, pumping means connecting said first and second branch conduits at points between the flow restrictors therein, said pumping means comprising a rotatable impeller for centrifugally pumping said liquid at a volumetric flow rate greater than the flow rate in said inlet and outlet conduits, said first and second restrictors having the same flow characteristics, said third and fourth flow restrictors having the same flow characteristics, the impeller of said pumping

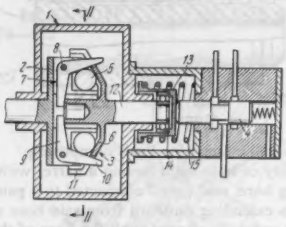
means producing an undesirable variation in volumetric flow rate with changes in liquid viscosity, and means for compensating for said undesirable variation comprising at least two of said restrictors dimensioned to have the same flow coefficient but whose flow coefficient changes with viscosity in the direction to compensate for said variation in volumetric flow rate produced by the impeller of said pumping means due to changes in said viscosity.

4,123,942

CENTRIFUGAL GOVERNOR

Leonid A. Rumyantsev, ulitsa Bolshaya Akademicheskaya, 77, korpus 3, kv. 79, Moscow, U.S.S.R.

Filed Sep. 1, 1977, Ser. No. 829,860
Int. Cl.[2] G01P *3/18*
U.S. Cl. 73—535 **3 Claims**



1. A centrifugal governor comprising: a body; an input element installed in said body and adapted for rotation; an output element installed in said body coaxially with said input element and adapted for axial movement; levers located in said body between said input and output elements; weights located in said body between said levers and the output element; turning axles of said levers secured on said input element; first arms of said levers contacting said output element; other arms of said levers being positioned with respect to said weights in such manner that during rotation of said input element said weights contact and exert a force on said other arms so that said levers turn about their axles and said first arms exert first axial forces on said output element thereby urging said output element in a direction axially away from said input element, said weights directly contacting said output element during rotation of said input element and exerting second axial forces on said output element that extend in the same direction as said first axial forces.

4,123,943

METHOD AND APPARATUS FOR NONDESTRUCTIVE ULTRASONIC MEASURING OF CAST ENGINE CYLINDER WALL THICKNESS

Patrick Roddy, Chalmsford; George W. Downes, Datchworth Knebworth; John V. Searle, London, and Terence W. Bregazzi, Enfield, all of England, assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 3, 1977, Ser. No. 765,166
Claims priority, application United Kingdom, Feb. 6, 1976, 04676/76
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—623 **1 Claim**

1. A method of testing cylinder block castings prior to machining to determine whether or not the cylinder walls will have adequate wall thickness and be completely machined after machining including the following steps:

(a) mounting a rotatable transducer in a selected position with respect to the cylinder block;

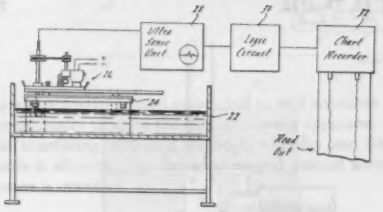
(b) generating, at a relatively low frequency, ultrasonic signals from said transducer;

(c) receiving reflected ultrasonic signal pulses from the inner and outer wall surfaces;

(d) measuring the intervals between generation of an ultrasonic pulse and receipt of the reflected pulses from the inner and outer wall surfaces;

(e) multiplying only the signal representative of the distance from the transducer to the inner wall surface by a factor determined as the ratio of the sonic velocity in the coupling medium divided by the sonic velocity in the material of the cylinder block to provide a modified signal;

(f) rotating the transducer about a reference axis in each cylinder bore which will be used for machining that cylinder;



(g) adding the modified signal representative of the distance from the transducer to the inner wall surface and the signal which is representative of the distance from the transducer to the outer wall surface;

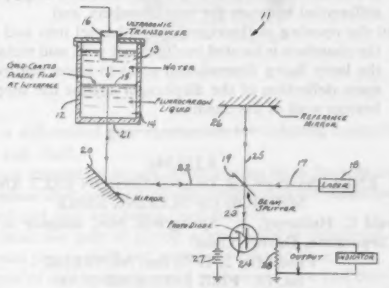
(h) rejecting the cylinder block if the outer wall surface distance signal falls below a predetermined value representative of minimal acceptable bore wall thickness in any one of the bores.

4,123,944

PORTABLE ULTRASONIC MEASUREMENT SYSTEM

Reuben S. Mezrich, Rocky Hill, and Cheston W. Robbins, Robbinsville, both of N.J., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Dec. 29, 1977, Ser. No. 865,712
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—657 **10 Claims**



1. An acoustic interferometer apparatus comprising a receptacle having an optically transparent bottom wall portion, an optically transparent, relatively high-viscosity first liquid in the lower portion of said receptacle, a sound-transmitting second liquid thereover, said liquids having substantially equal acoustic impedances, means to couple an acoustic transducer under test to said second liquid, an acoustically drivable optically reflective horizontal film element at the interface between said liquids, a source of coherent monochromatic radiation, means to direct coherent radiation from said source through said transparent bottom wall portion to said reflective film element so as to be reflected therefrom and to define a measure beam whose path length varies in accordance with vertical movements of said film element, means generating a

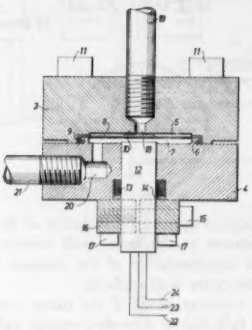
fixed path-length reference beam from said source, and means to combine the measure and reference beams to form a composite interference beam.

4,123,945

PRESSURE INDICATOR

Gunnar M. Bergstrand, 40 Stangholmsbacken 56, S-127 40 Skärholmen, Sweden

Filed Jun. 10, 1977, Ser. No. 805,482
Int. Cl.[2] G01L 9/10
U.S. Cl. 73—722 5 Claims



1. A pressure indicator of the type comprising a diaphragm box containing two chambers which are completely separated by a thin, non-metallic resilient diaphragm, each of said chambers communicating via a connecting channel with an associated one of two fluid sources between which a pressure differential is to be established, a metal plate being fastened to the diaphragm, and an inductive sensor being disposed at one of the walls of the diaphragm box, so that a pressure change in at least one of the chambers causes a change in distance between the metal plate and the sensor and, consequently, an output signal from the sensor, wherein

(a) the bottom wall of at least one of the chambers is located and shaped so as to support the diaphragm upon deflection at substantially all portions thereof due to a large pressure differential between the two chambers, and

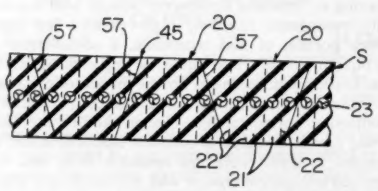
(b) the opening of the connecting channel into said one of the chambers is located in alignment with said metal plate, the latter being dimensioned so as to cover said opening upon deflection of the diaphragm against the supporting bottom wall of the chamber.

4,123,946

ENDLESS POWER TRANSMISSION BELT AND METHOD OF MAKING SAME

Gerald C. Hollaway, Jr., Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed May 2, 1977, Ser. No. 793,102
Int. Cl.[2] F16G 1/00; B29D 17/00
U.S. Cl. 74—231 P 20 Claims



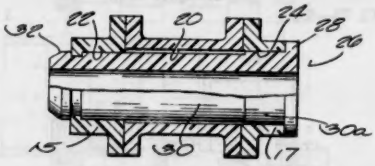
1. An endless power transmission belt defined by a single continuous helically wound elongated strip of polymeric material having load-carrying means extending throughout its length, said strip having adjoining turns thereof bonded together so that said polymeric material thereof is a homogeneous mass and said belt is a unitary structure.

4,123,947

NON-METALLIC TRANSMISSION CHAIN

Larry C. Smith, New Berlin, and Robert J. Webers, Racine, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Aug. 26, 1977, Ser. No. 828,051
Int. Cl.[2] F16G 13/02; B21L 13/00; B66F 7/06
U.S. Cl. 74—245 P 7 Claims



1. A non-metallic chain for loads comprising:

(a) a plurality of links each having a barrel with an axially extending bore, said barrel connected to a pair of spaced side arms extending outward from said bore and having openings coaxially aligned with the bore of the barrel of the next adjacent link, said links being comprised of a material having a tensile strength of at least 8500 psi and creep value of less than 2.0% in 10 years at a stress of 2000 psi,

(b) a plurality of pins each of which is adapted to extend through said barrel and said openings, said pin being made of a glass fiber reinforced polymeric material having a tensile strength of at least 18,000 psi, a flexure modulus of not less than 1,000,000 psi, a creep value of less than 0.5% in 1 year at 2000 psi, and a dimensional change from moisture absorption, essentially the same as the link material, and

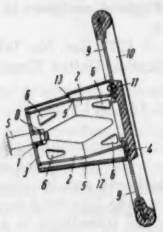
(c) means existing as cooperating structure on both said links and pins for releasably locking said pin against longitudinal movement while housed in the bore of said barrel.

4,123,948

ENERGY ABSORPTION ELEMENT

Gregor Zeller, Obernau, Main, Fed. Rep. of Germany, assignor to Firma Petri AG, Aschaffenburg, Fed. Rep. of Germany

Filed Mar. 31, 1977, Ser. No. 783,286
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1976, 2614041
Int. Cl.[2] B62D 1/10
U.S. Cl. 74—492 10 Claims



1. An energy absorption element adapted for connecting a vehicular steering wheel to a steering wheel shaft spaced apart axially from the steering wheel, said element comprising:

a generally tubular body comprised of a plurality of support

members extending axially for placement between the steering wheel and the steering wheel shaft; and

means comprising a radially outward bend in each of said support members for producing a radially outward collapse of said support members in response to an impact upon the steering wheel, each of said support members comprising a single X-shaped configuration with said radially outward bend being located in the area of intersection of the legs of the X-shaped configuration.

4,123,949

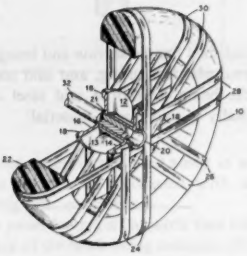
INERTIAL ENERGY STORAGE DEVICE

Charles E. Knight, Jr., Knoxville; James J. Kelly, Oak Ridge, and Roy E. Pollard, Powell, all of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 14, 1977, Ser. No. 833,118

Int. Cl.[2] F16F *15/30;* **F16D** *3/58, 3/14*

U.S. Cl. 74—572 **6 Claims**



1. An inertial energy storage device rotatable about an axis comprising a fiber-resin composite ring, a metal hub concentrically disposed within said ring, and a plurality of fiber-resin composite bandsets of uniform width coupling said ring to said hub for co-rotation therewith, with each bandset comprising a pair of parallel bands each in the configuration of a closed hoop extending about the outer surface of the ring and projecting across a chordal plane of the ring and the hub contiguous to the axis of rotation with the bands of each bandset being disposed on opposite sides of the axis of rotation, each band of each bandset consisting of single-ended filamentary material wound in a side-by-side relationship and encased in a resin matrix, each of said bands being uniformly stressed over the width thereof during rotation of the device about said axis, each of said bands being disposed at circumferentially spaced-apart locations from one another about the periphery of the ring and with the bandsets disposed in an overlapping relationship with one another on portions of said hub at locations adjacent to and encompassing the axis of rotation.

4,123,950

RETRO-FITTABLE TAPE TRIP MECHANISM

Keith E. Schubert, Rowayton, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 18, 1976, Ser. No. 733,365

Int. Cl.[2] B65C *11/00;* **G05G** *11/00*

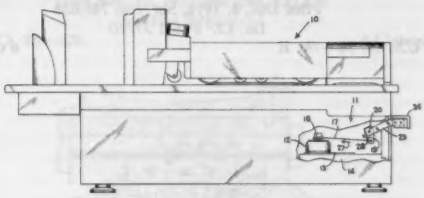
U.S. Cl. 74—625 **8 Claims**

1. A retro-fittable automatic electrically actuated tape trip mechanism for use with a postage tape dispensing apparatus, comprising:

a mechanical tape dispensing apparatus including a trip mechanism having a rotatable shaft for actuating said mechanical tape dispensing apparatus to dispense a quantity of postage tape when said shaft is rotated to a dispensing position;

a flexible cable operatively connected to said rotatable shaft for rotatively pulling said shaft from a rest position to said dispensing position;

a solenoid supported on said apparatus by mounting means and connected to said flexible cable for pulling said cable, and hence, rotating said rotatable shaft from said rest position to said dispensing position; and



a manual actuation means connected to said rotatable shaft for manually tripping the tape dispensing apparatus without interfering with said solenoid, whereby said flexible cable is allowed to collapse when said manual actuation means is operated.

4,123,951

DIFFERENTIAL GEAR MECHANISM FOR VEHICLES

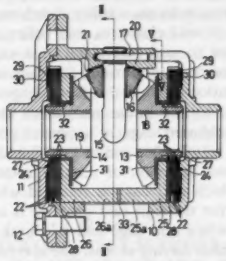
Tooru Kagata, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Dec. 17, 1976, Ser. No. 751,673

Claims priority, application Japan, Dec. 19, 1975, 50/152330; Apr. 9, 1976, 51/40591; Jun. 10, 1976, 51/75463[U]

Int. Cl.[2] F16H *1/44*

U.S. Cl. 74—711 **3 Claims**



1. A differential gear mechanism for vehicles, comprising:

an axle shaft;

a case rotated by means of the driving force from an engine;

a pinion shaft perpendicularly intersecting the rotational axis of said case and being fixed thereto;

at least one pair of pinion gears rotatably supported upon said pinion shaft and supported by said case;

a pair of side gears disposed within said case and enmeshed with said pair of pinion gears at both sides thereof for transmitting the driving force to said axle shaft;

a pair of pressure plates disposed exteriorly of said pair of side gears and slidably engaged with an inner peripheral face of said case at the outer peripheral face thereof, and in addition, supporting said pair of side gears and having a cam portion which is formed by end portions thereof which extend inwardly of said case from the outside of said side gears wherein said cam portion is located between said pair of pinion gears and is circumferentially mounted with respect thereto; and

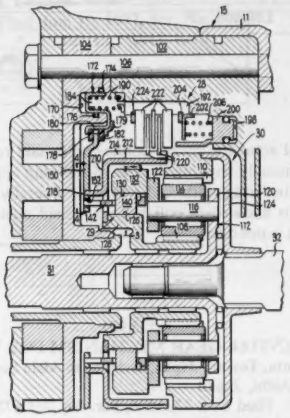
clutch means interposed between said pair of pressure plates and the inner side of said case, and engaged with said pair of side gears at the inner side thereof and with said pair of pressure plates at the outer side thereof.

4,123,952

PLANETARY TRANSMISSION MECHANISM

Robert W. Wayman, Bloomfield Hills, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 8, 1976, Ser. No. 748,626
Int. Cl.² F16H *57/10*
U.S. Cl. 74—781 R **6 Claims**



1. A transmission mechanism comprising a planetary gear set having a plurality of relatively rotatable elements, a brake mechanism for one of said elements engageable to hold said element stationary and establish a high-speed drive ratio through said transmission, a roller clutch mechanism mounted between two of said elements, said roller clutch including a race connected to said one element, a cage for said roller clutch mechanism, a controller for said cage comprising a rotationally stationary plate member engageable with said cage and connected to said brake mechanism and operative when actuated to hold said cage in a central position wherein no direct driving relationship can be established between said two elements in one direction of relative rotation and having a position in which said cage is released whereby a two way one-to-one drive through said gear set is established by said roller clutch when said cage and said brake are released and said plate member having at least one aperture therein and said cage has at least one tang member thereon, the plate member being movable to engage said tang in said aperture.

4,123,953

RATCHET WRENCH

Hipolito Corbacho, Jr., 401 Rock Ave. Ext., Green Brook, N.J. 08812

Filed Jun. 9, 1977, Ser. No. 805,100
Int. Cl.² B25B *13/46*
U.S. Cl. 81—60 **5 Claims**

1. A ratchet wrench, comprising:

an elongated handle including a first section and a second section,

a circular head portion connected to said elongated handle and including a socket,

a ratchet mechanism mounted within said socket,

an internal core member formed of steel,

said internal steel core member being an integral member including a handle section extending longitudinally within the first section of said elongated handle and also including a head section extending around the interior of said circular head portion and having an opening defining said socket,

said elongated handle and said circular head portion including an external housing formed of rigid plastic material enclosing and insulating the handle section and substantially enclosing all exterior surfaces of the head section of said internal core member,

said first section of said elongated handle being formed by

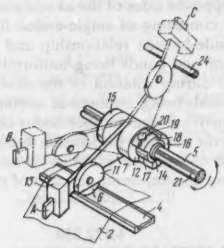
said internal steel handle section and being surrounded by said external plastic housing, and said second section of said handle being devoid of said steel core and being formed totally of said plastic material.

4,123,954

DEVICE FOR LONGITUDINAL CUTTING OF THERMO-SOFTENING MATERIALS INTO STRIPS

Ivan A. Kolosov, ulitsa Astrakhanskaya 118, kv. 54, Saratov, U.S.S.R.

Filed Sep. 8, 1977, Ser. No. 831,495
Int. Cl.² B26D *3/12, 7/10*
U.S. Cl. 83—171 **1 Claim**



1. A device for longitudinal cutting of a thermo-softening material, such as a band of a separating material for battery electrodes comprising: a common shaft; a roll holder disposed parallel to said shaft; a cutting mechanism with at least one electric cutter mounted on said common shaft; at least two rotatable pulling rollers disposed parallel to said common shaft to ensure movement of said band in the course of cutting said material; an arm carrying said electric cutter having a hub, and said hub being freely mounted by means of an intermediate sleeve adjustably fastened to said common shaft along the line of cut; said hub having a segment tooth on a surface face and said intermediate sleeve having a mating segment tooth, and said teeth lifting said electric cutter automatically upon interaction of said segment teeth on the turning of said common shaft in a predetermined direction.

4,123,955

MITERING DEVICE FOR RECTANGULAR PICTURE FRAMES

Glenn Marlow, 3523 Robin Dr., Louisville, Ky. 40216

Filed Jun. 18, 1976, Ser. No. 697,413
Int. Cl.[2] B27B 25/08, 27/06
U.S. Cl. 83—435.1 11 Claims

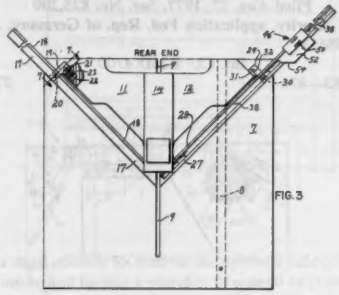


FIG. 3

1. A device for mitering rabbeted stock in making picture frame members on a table associated with an operatively mounted mitering saw, comprising:

A. a portable panel having a flat work face for engaging the flat back face of the stock being mitered, a front end, a rear end and a forwardly-rearwardly extending slot between such ends to receive said mitering saw,

1. said panel being removably mountable on the table for guided back and forth sliding movement;

B. a panel-mounted abutment means including an abutment

1. having an elongate rabbet-receiving abutment edge facing outwardly away from the vertical plane of the saw in a position where said outer abutment edge

a. is adjacent to the work face of the panel,

b. is operative to abut the perimetric surface of rabbeted stock having its flat back face resting on the panel,

c. underlies the face flange of the rabbeted stock it abuts,

d. converges obliquely toward and terminates adjacent the panel saw slot, and

e. faces outwardly over substantially unobstructed space adjacent the panel to permit said resting stock to be slidably moved on the panel into and out of perimetric surface abutment with said rabbet-receiving abutment edge;

C. scale means associated with said abutment

1. for calibrating said rabbeting-receiving outer abutment edge in terms of length dimensions beginning with a reference point in the vicinity of the saw plane; and

D. stop means associated with said abutment and settable to a selected calibration

1. where said calibrated outer abutment edge provides, between said stop means and the plane of the adjacent face of the mitering saw, the precise end-to-end length dimension desired of the perimetric surface of the rabbet, and

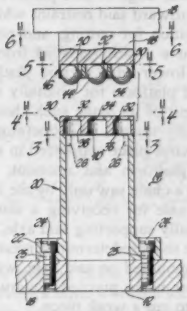
2. where said stop means is operative, when rabbeted stock is operatively positioned with its back face resting on the work face of the panel, with its perimetric surface abutting said calibrated outer abutment edge and with the once mitered end of the stock abutting said stop means, to hold the stock against endwise movement outwardly beyond said operative position while the stock is mitered at said saw plane.

4,123,956

SELF-ADJUSTING PUNCH DEVICE

David L. Harvey, Schoolcraft, Mich., assignor to Arco Industries Corporation, Schoolcraft, Mich.

Filed Sep. 12, 1977, Ser. No. 832,136
Int. Cl.[2] B26F 1/14
U.S. Cl. 83—620 4 Claims



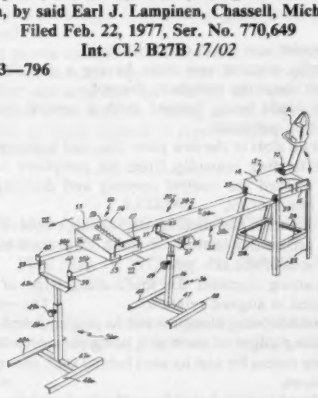
1. A device for blanking out holes in a shearable material, said device including a fixed die element having hole means formed therein; a movable member aligned with said die element; and punch means mounted upon said movable member, said punch means including a retaining element, ball means loosely retained in and adapted to project from said retaining element, said ball means being aligned with and having a diameter greater than the hole means in the die element, and an elastomeric backing member mounted between said retaining element and the movable member and adapted to be engaged by said ball means, said movable member being adapted to position said ball means in peripheral contact with the aligned hole means in said die element whereby said ball means projects partially within said hole means, said peripheral contact moving said ball means into abutting relationship with said backing member causing material retained between the coacting surfaces of said ball means and said die hole means to be sheared off.

4,123,957

CHAIN SAW AND WORK PIECE SUPPORT APPARATUS

W. Wally Niemela, Box 165E, Chassell, Mich. 49916, and Earl J. Lampinen, Hancock, Mich., assignors to W. Wally Niemela, by said Earl J. Lampinen, Chassell, Mich.

Filed Feb. 22, 1977, Ser. No. 770,649
Int. Cl.[2] B27B 17/02
U.S. Cl. 83—796 19 Claims



1. A support apparatus for supporting logs, boards and other work pieces during cutting and for supporting a chain saw for such cutting, the chain saw being of the type having an extend-

ing blade with a free end and a cutting chain extending along the peripheral edge thereof, said apparatus comprising a plurality of support legs adapted to be supported by a supporting surface and a stationary, work piece support platform mounted on said legs, said platform having a top surface inclined downwardly toward an operator position for supporting a work piece, upper, lower and side edges, and a work piece restraint mounted at the lower edge of said platform whereby gravity urges work pieces toward said restraint which holds them in a predetermined position for cutting; and pivot means on said platform located at a position spaced from said work piece restraint and said lower edge of said platform adjacent said upper edge of said platform for pivotally supporting a chain saw by the free end of its blade such that said saw may be pivoted downwardly toward said operator position into engagement with a work piece supported in said predetermined position by said platform and restraint; said pivot means adapted to support a chain saw only by the free end of its blade and including an axle for receiving a saw blade thereover, means for rotationally supporting said axle, and biasing means for urging said axle to a predetermined rotational position such that a saw, when mounted on said axle, will be returned to a raised position after being pivoted downwardly toward said operator position to cut a work piece.

4,123,958

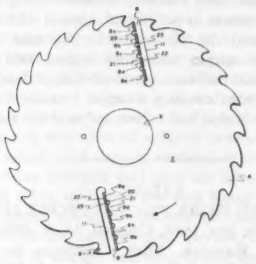
CIRCULAR SAW BLADE

John H. Wright, Nacagdoches, Tex., and George H. Jacobsen, Portland, Oreg., assignors to Pacific Saw & Knife Company, Portland, Oreg.

Continuation of Ser. No. 680,531, Apr. 26, 1976, abandoned. This application Oct. 12, 1977, Ser. No. 841,296

Int. Cl.[2] B23D *45/00*; B27B *5/00*

U.S. Cl. 83—837 **3 Claims**



1. A circular saw blade comprising:

a generally circular saw plate having a plurality of teeth spaced about the periphery thereof,

the saw blade being formed with a central opening for mounting purposes,

at least two slots in the saw plate disposed between the teeth and extending inwardly from the periphery of the saw plate toward the central opening and dividing the saw plate into sectors,

cutting elements mounted on the leading edges of the teeth, each projecting laterally in both directions beyond the side faces of the saw plate,

plural cutting elements for the trailing edge of each slot mounted in aligned relation,

said elements being elongate and having opposed end faces,

said trailing edges of each slot being formed with a single arcuate recess for and located behind each pair of opposed end faces,

each pair of opposed end faces being spaced from one another only slightly to provide a gap not greater than the width of the recess,

said recesses providing lands isolated from one another and to which said cutting elements are secured,

said recesses serving to distribute stress in the areas between the cutting elements.

4,123,959

SLICING MACHINE FOR BACON OR THE LIKE

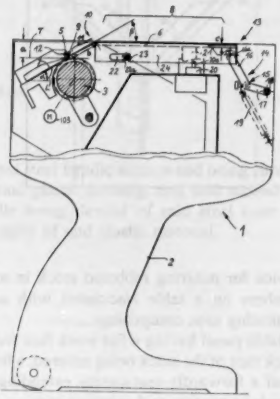
Hermann Schill, Kehl, Fed. Rep. of Germany, assignor to Maja-Maschinenfabrik Hermann Schill GmbH, Fed. Rep. of Germany

Filed Aug. 17, 1977, Ser. No. 825,200

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1976, 2638612

Int. Cl.[2] B26D *4/00*

U.S. Cl. 83—874 **27 Claims**



1. In a machine for slicing bacon or analogous products, the combination of a support; a knife installed in said support and defining a cutting plane, said knife having a cutting edge; a mobile product feeding device mounted in said support adjacent to said cutting edge; a table mounted in said support for movement between first and second positions in which a portion of said table respectively overlies and exposes said cutting edge and said feeding device, said table having a product supporting surface which is accessible from above so that a product which is placed onto said surface can be manually moved along said surface forwardly into the range of said feeding device in the second position of said table; and displacing means for moving said table between said positions, said displacing means being activatable by an attendant to move said table to and to normally maintain said table in said second position so as to enable such attendant to move a product into the range of said feeding device as long as the attendant maintains the table in said second position through the medium of said displacing means.

4,123,960

DEVICE FOR THE MANUAL PLAYING OF ELECTRONIC MUSICAL INSTRUMENTS

Rainer Franzmann, Mittelstrasse 24, 2000 Norderstedt 2, Germany

Filed Mar. 11, 1977, Ser. No. 776,812

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1976, 2610782

Int. Cl.[2] G10H *3/06*

U.S. Cl. 84—1.17 **16 Claims**

1. A device for playing an electronic musical instrument comprising

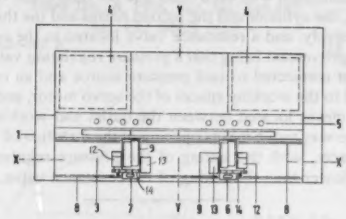
(a) a fixed support,

(b) at least one manual mounted on said support for movement thereon in a horizontal *x* direction from side to side with respect to a player seated in front of said support,

(c) said manual including

(i) a first console having a series of digitally operable main keys representing different tones and positioned for operation by the first finger, middle finger, and ring finger of a player's hand,

(ii) a second console located on one side of said first console and having a plurality of special keys positioned for operation by the little finger of a player's hand, and



(iii) a third console located on the opposite side of said first console and having a plurality of special keys positioned for operation by the thumb of a player's hand, and

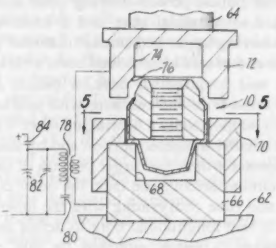
(iv) a trestle unit for supporting a player's hand in playing position with the thumb and fingers within reach of the respective keys on the respective consoles.

4,123,961

WHEEL NUT WITH WELDED CAP

Joseph W. Chaivre, and Albert A. Jadach, both of Royal Oak, Mich., assignors to Towne Robinson Fastener Company, Southfield, Mich.

Filed Apr. 1, 1976, Ser. No. 672,746
Int. Cl.[2] F16B *37/14*
U.S. Cl. 85—35 **10 Claims**



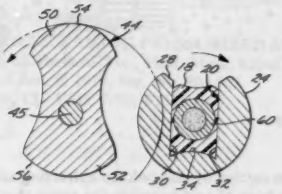
1. A nut having a central threaded aperture, polygonal sides, a first end adapted to engage a wheel, a second end having an end face extending at right angles to the axis of the nut, and a sheet metal cap for the nut having a section extending over the polygonal sides and and end section adapted to cover the second end of the nut, said end section being connected to the section of the cap which covers the polygonal sides by a section formed fully around the perimeter of the cap and having an extension at right angles to the axis of the nut so as to be parallel to said end face, such connecting section being in juxtaposed contact throughout a substantial area with and welded to said end face, whereby forces exerted on the capped sides creating moments about the central axis of the nut will result in shear forces exerted on the weld.

4,123,962

ROTARY BREECH APPARATUS FOR AN AUTOMATIC WEAPON

Charles E. Williams, 1036 Edwards Ave., Santa Rosa, Calif. 95401

Filed Feb. 22, 1977, Ser. No. 770,629
Int. Cl.[2] F41F *11/00*
U.S. Cl. 89—13 R **4 Claims**



1. In an automatic weapon of the open chamber type which includes a barrel having a bore; a breech located adjacent said barrel and adapted for rotation about a breech axis coaxial with the longitudinal axis of said bore, said breech including an elongated chamber having an opening at one side, the marginal portions adjacent to and defining said opening constituting a first seal area, said first seal area following a circumferential first path of travel during said rotation of said breech; a round feeding mechanism providing automatic feeding of a round of ammunition into said chamber when said opening comes into opposition with a feeding station; a round ejecting mechanism providing automatic ejection of a round of ammunition from said chamber when said opening comes into opposition with an ejecting station; breech rotating means coupled to said breech for rotating said breech about said breech axis thereby successively bringing said opening into opposition with said feeding station and said ejecting station, an improved rotary breech apparatus comprising:

a chamber closure mounted for rotation about a closure axis adjacent and parallel to said breech axis, said closure axis being located outwardly of said first path of travel of said first seal area, said chamber closure having a surface portion constituting a second seal area, said second seal area following a circumferential second path of travel during said rotation of said chamber closure, said second seal area being adapted, upon location of said second seal area in opposition to said first seal area, to seat against said first seal area in complemental relation and thereby substantially prevent escape of propellant gases from said chamber; and

coupling means operative to effect rotation of said chamber closure in a direction opposite that of said breech whereby said first seal area and said second seal area repetitively come into opposition for sealing off said opening to said chamber in timed relation to repetitive firing of rounds in said chamber.

4,123,963

FIREARM AND CASELESS AMMUNITION THEREFOR

Ralph D. Junker, 33 N. Main St., Southampton, N.Y. 11968

Filed May 11, 1977, Ser. No. 796,005
Int. Cl.[2] F41D *1/04*
U.S. Cl. 89—152 **18 Claims**

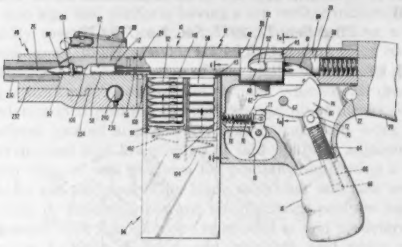
1. A firearm for firing caseless ammunition which comprises a projectile and a separate propellant cartridge, said firearm comprising:

a receiver,

magazine means for feeding said projectile and said cartridge into said receiver,

a bolt slidably mounted in said receiver, said bolt including laterally open pocket means for receiving said projectile and said cartridge from said magazine means and for

advancing them to an armed position wherein said projectile is disposed within a bore of said barrel, and



means carried by said bolt for extracting said projectile from the bore of said barrel in the event that said projectile is not fired.

4,123,964

PRESSURE CONTROL MEANS FOR DISTRIBUTION OF MEDIUM FROM A RESERVOIR OR STORAGE VESSEL

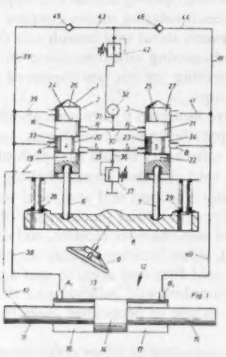
Gunther Strauff, Kaarst, Fed. Rep. of Germany, assignor to Langen & Co., Dusseldorf, Fed. Rep. of Germany

Division of Ser. No. 425,549, Dec. 17, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 669,093

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1972, 2261872

Int. Cl.[2] F15B *13/14*

U.S. Cl. 91—434 **2 Claims**



1. A pressure control means for vehicles having steerable wheels and a steering wheel for the wheels, including a control valve having a four-way control, at least two cylinders and two control pistons located in the cylinders, a pressure source, a return line to a reservoir, a servo motor provided with a cylinder member, a piston member and working space on each side of the piston member, said control pistons serving to selectively connect the working spaces of the servo motor with the pressure source or return line, said valve constituting a power-output member and operably connected to one of the members of the servo motor, with said one member of the servo motor being operably coupled with the steerable wheels, an actuating member for the control pistons movable relative to the valve and constituting a power input member, means operably connecting the actuating member to the steering wheel, coupling means connecting the input and output members, said control pistons and cylinders coacting to provide reaction chambers stressed by the pressures of the working spaces of the servo motor, first means providing communication between one of said cylinders and one working space of the servo motor, second means providing communication between the other of said cylinders and the other working space of the servo motor, third means providing communication between the cylinders, the return line being in communication with the third means, fourth means providing communication between the pressure source and the cylinders, and the first and second means having branches leading to the accompanying reaction chambers, when the actuating member is in a neutral position, the working spaces of the servo motor are in communication with each other and the return line via the first means, the cylinder and the second means and the third means, respecitvely, and a resistance valve located in the return line, the improvement being that a pressure regulating valve having an inlet connected to said pressure source and an outlet connected to the working spaces of the servo motor, and one-way valve means located between the outlet and working spaces, the one-way valve means opening in the direction of the working spaces, with the setting of the pressure regulating valve being lower than the setting of the resistance valve.

4,123,965

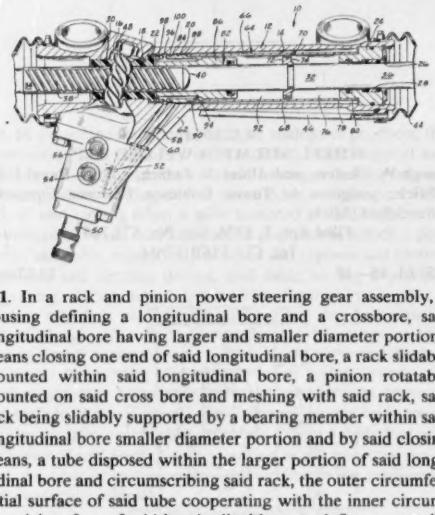
RACK AND PINION POWER STEERING GEAR

Arthur K. Brown; Donald J. Baker, and Robert W. Jackson, all of South Bend, Ind., assignors to The Bendix Corporation, Southfield, Mich.

Continuation of Ser. No. 642,280, Dec. 19, 1975, abandoned. This application Aug. 8, 1977, Ser. No. 822,572

Int. Cl.[2] F01B *9/00*; F16J *13/02*

U.S. Cl. 92—136 **1 Claim**



1. In a rack and pinion power steering gear assembly, a housing defining a longitudinal bore and a crossbore, said longitudinal bore having larger and smaller diameter portions, means closing one end of said longitudinal bore, a rack slidably mounted within said longitudinal bore, a pinion rotatably mounted on said cross bore and meshing with said rack, said rack being slidably supported by a bearing member within said longitudinal bore smaller diameter portion and by said closing means, a tube disposed within the larger portion of said longitudinal bore and circumscribing said rack, the outer circumferential surface of said tube cooperating with the inner circumferential surface of said longitudinal bore to define an annular passage therebetween, a piston mounted on said rack and cooperating with the inner circumferential surface of said tube to substantially define a pair of chambers, an opening in said tube to communicate said annular passage with one of said chambers, a pair of conduits within said housing communicating, respectively, with said annular passage and with the other of said chambers, a sleeve engaging said larger diameter portion of said longitudinal bore immediately adjacent said bearing member, said larger diameter portion of said longitudinal bore having an annular groove surrounding said sleeve, seal means interposed between the larger diameter portion of said longitudinal bore and said sleeve on both sides of said annular groove, one of said pair of conduits including a first section extending through the wall of said larger diameter portion of said longitudinal bore to communicate with the annular groove and a second section adjoining the annular groove, said second section being disposed entirely within said sleeve and extend-

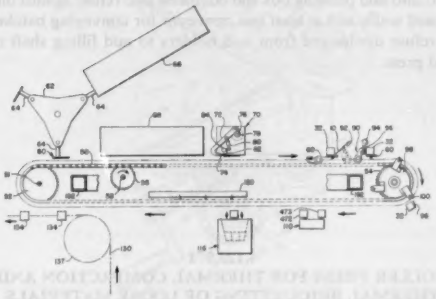
ing therethrough to communicate directly with the annular groove and the other of said chambers.

4,123,966

CARTON FORMING APPARATUS

Josef J. Buschor, San Jose, Calif., assignor to Nolex Corporation, Los Angeles, Calif.

Filed Dec. 8, 1976, Ser. No. 749,182
Int. Cl.[2] B31B *1/30*
U.S. Cl. 93—49 R **19 Claims**



1. In an apparatus for forming a carton from a blank comprising a plurality of side wall panel elements delineated by scoring established bending lines and having associated with the ends of said side wall panel elements either an end sealing tab element or an end closure panel element delineated by scoring established bending lines and arranged to provide at least one end closure panel at each end of the carton, and further having in association with the side an end one of said side wall panel elements a side seam sealing tab element delineated by a scoring establishing a bending line;

a plurality of carton blank carriers each having means for retentively supporting a carton blank;

a movable mandrel associated with each of said carton blank carriers, said mandrel being movable relative to its associated carton blank carrier;

means for moving the mandrel into a covering relation to one of the side wall panel elements and to one of the end closure panels of a supported carton blank;

a work station for flexing said side seam sealing tab element about its bending line scoring;

a work station for folding around the mandrel at the side wall panel bending lines a blank supported by a carrier to the extent that the flexed side seam sealing tab element associated with an end one of the side wall panel elements of the blank is spacedly confronted by the other end of one of the side wall panel elements;

holding means associated with said carrier for holding said blank folded around the mandrel with the spacedly confronting elements in their spacedly confronting attitudes;

means for conditioning confronting blank elements for permanent adhesive interengagement;

means for causing said holding means to close one of said confronting blank elements against the other whereby to seal them together to form of said blank an open-ended tube;

a work station for flexing the end-sealing tab element at one and the same end of each side wall panel element provided with such a tab inwardly of the openended tube;

means associated with said carrier for flexing the end closure panel element at the end of the blank having its end sealing tab elements flexed to bring said end closure panel element into spaced confrontation with said flexed end-sealing tab elements;

means for causing said end closure panel element flexing means to close said end closure panel element against said end sealing tab elements to seal them together to effect closure of one end of said tube;

means for separating said mandrel from said tube and said tube from the carrier; and

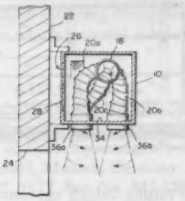
transport means for transporting said carriers into successive and progressive cooperation with said work stations, said mandrel being movable relative to said transport means.

4,123,967

AIR BARRIER DEVICE USING PRESSURIZED SWIRLS

Arnold A. Shanis, 64 Packard Ave., Hull, Mass. 02045

Filed Jun. 8, 1977, Ser. No. 804,522
Int. Cl.[2] F24F *9/00*; F15D *1/02*
U.S. Cl. 98—36 **6 Claims**



1. Apparatus for creating an air barrier to energy transfer through door, window, or like openings, in a building comprising

a housing adapted to be mounted within the building above the opening

an air intake in said housing,

a plurality of air discharge conduits provided with internal means for whirling the air passing therethrough and arranged to discharge said air downwardly across said opening as a series of distinct side-by-side pressurized swirls to form an air curtain barrier to energy transfer in either direction through said opening, and

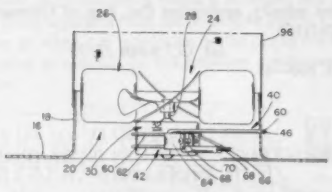
a blower mounted in said housing to receive air from said intake and discharge it through said conduits.

4,123,968

POWER VENT

Richard C. Malott, Spring Lake, Mich., assignor to Leigh Products, Inc., Coopersville, Mich.

Filed Apr. 18, 1977, Ser. No. 788,281
Int. Cl.[2] F24F *7/02*
U.S. Cl. 98—43 R **19 Claims**



3. A power vent comprising:

a base having an aperture therein;

an open ended shroud joined to said base at said aperture, said shroud defining a plurality of circumferentially and radially extending wire receiving passages spaced around the periphery thereof;

fan means for moving air through said shroud;

wire means carried by said shroud and including portions within and surrounded by said wire receiving passages for reinforcing the shroud and for defining a fan mount; and

means for securing said fan means to said fan mount, each of said wire means comprising:

a plurality of single length bent wires, each of said wires defining a base portion disposed within one of said wire receiving passages and a pair of legs extending radially inwardly towards the center of said shroud, the free ends of each of the legs of said wire means being bent at substantially a right angle to thereby define said fan mount.

4,123,969

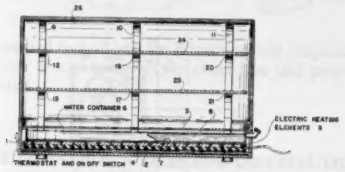
YEAST RAISING BAKING APPLIANCE

Warren J. Abbate, 813 Westacres, Pueblo, Colo. 81005

Filed Dec. 23, 1977, Ser. No. 863,785

Int. Cl.[2] A01J *11/04;* A23C *3/02*

U.S. Cl. 99—467 **1 Claim**



1. A yeast raising baking appliance, comprising

a housing having a bottom and a top;

thermal insulation in the housing at the bottom thereof;

electric heating means in the housing on the thermal insulation;

a flat pan type water container having a bottom resting on the electric heating means and a top in spaced parallel relation with the bottom and having perforations formed therethrough for releasing steam produced by heating of water in said container;

a plurality of substantially U-shaped support members removably mounted in the housing in spaced substantially parallel relation extending substantially perpendicularly from the bottom of said housing and extending beyond said housing, each of said support members having pan supporting means for supporting a plurality of baking pans within said support members in spaced substantially parallel relation with the bottom of the housing; and

a cover of transparent material over the support members.

4,123,970

APPARATUS FOR FILLING CONTAINERS WITH COMPACTED REFUSE

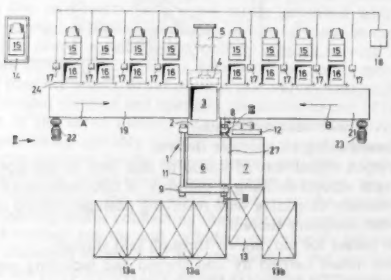
Siegfried Quante, Düsseldorf, Germany, assignor to Lindemann Maschinenfabrik GmbH, Düsseldorf, Germany

Filed May 3, 1977, Ser. No. 793,311

Claims priority, application Fed. Rep. of Germany, May 13, 1976, 2621158

Int. Cl.[2] B30B *15/30*

U.S. Cl. 100—45 **6 Claims**



1. Apparatus for use in the filling of a container with refuse which has been compacted by pressing, said apparatus comprising a weighing device for weighing refuse collecting vehicles, a plurality of refuse holders, each of said holders being capable of holding a batch of refuse from one of said refuse collecting vehicles, means for discharging said batches of refuse from said holders, a refuse press, said press comprising a filler box, a pressing plunger, means for moving said pressing plunger along a horizontal path through said filler box, a filling shaft leading into said filler box in a direction transverse to the direction of movement of said pressing plunger and a pressing box aligned with said filler box, said pressing box including a plurality of walls, said plunger being operative to push refuse, which is introduced through said filling shaft into said filler box, into said pressing box and compress said refuse against one of said walls, and at least one conveyor for conveying batches of refuse discharged from said holders to said filling shaft of said press.

4,123,971

ROLLER PRESS FOR THERMAL COMPACTION AND THERMAL BRIQUETTING OF LOOSE MATERIALS

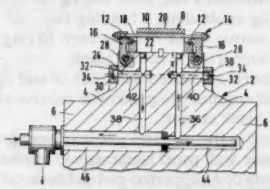
Hans-Georg Bergendahl, Bochum-Weitmar, Fed. Rep. of Germany, assignor to Maschinefabrik Köppern GmbH & Co KG, Hattingen, Fed. Rep. of Germany

Filed Aug. 9, 1976, Ser. No. 713,060

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1975, 2536670

Int. Cl.[2] B02C *11/08;* B30B *15/34;* B29C *3/02*

U.S. Cl. 100—93 RP **5 Claims**

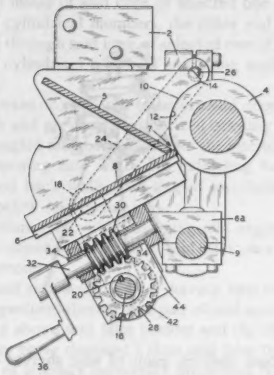


1. A roller press, for the thermal compaction and briquetting of loose material, having rollers, each said roller comprising a core having a cylindrical outer surface and a shell carried on the core, the shell comprising a plurality of adjacent segments each extending longitudinally of the roller and having longitudinal edges parallel to the axis of the roller and means to detachably secure the ends of said segments to said roller core, said roller core having therein circumferentially-spaced cooling ducts parallel to the axis of rotation of said roller at positions inwardly of the outer surface of sad roller core, said cooling ducts being sealed from communication with said segments, means interconnecting said cooling ducts to form at least one cooling circuit, means defining an inlet and an outlet for the passage through each said coolant circuit of a coolant, and means defining common inlet and outlet connections coaxial with said roller core and respectively communicating with said inlet and outlet means of each said coolant circuit, a plurality of annular plates being provided on end faces of said roller core, said means interconnecting said cooling ducts in part including an internal duct circumferentially extending within said annular plate, said internal duct communicating with at least two adjacently disposed said cooling ducts in the roller core to produce said at least one cooling circuit therein, said segments being removable from said core without disconnecting said at least one cooling circuit.

4,123,972
POSITIONING MECHANISM FOR LOCATING THE EDGE OF AN INK METERING MEANS

C. Robert Gasparrini, Rye, N.Y., assignor to Baldwin-Gegenheimer Corporation, Stamford, Conn.

Filed May 12, 1977, Ser. No. 796,184
Int. Cl.[2] B41F *31/04, 31/06*
U.S. Cl. 101—363 6 Claims



1. A positioning assembly on a press frame for positioning an ink metering means with respect to an ink fountain roller comprising:

(a) a metering means mounting block having an ink metering means with an ink metering edge mounted thereon;

(b) means for mounting said mounting block for movement on said press frame to and from a position adjacent the ink fountain roller;

(c) stop means on said mounting block for directly engaging said ink fountain roller to position said ink metering edge with respect to said ink fountain roller;

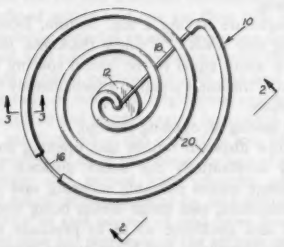
(d) positioning means for moving said mounting block with respect to said press frame;

(e) said positioning means including means for resiliently maintaining said stop means in engagement with said ink fountain roller so that said ink metering edge is maintained a constant distance from said ink fountain roller despite eccentricities or manufacturing imperfections in said ink fountain roller or the mounting thereof.

4,123,973
BROCADE TOOL

Frank O. Genevase, 10708 NE. 15th St., Vancouver, Wash. 98664

Filed Mar. 15, 1977, Ser. No. 777,832
Int. Cl.[2] B41K *1/28*
U.S. Cl. 101—379 3 Claims



1. A tool for picking up a paste-like material and applying such material to a surface for making a design on said surface, said tool comprising

(a) a handle having upper and lower ends,

(b) a wire stem projecting longitudinally from the upper end of said handle,

(c) and a head on the upper end of said stem,

(d) said head being constructed of wire and having an extension integral with said stem and forming a a selected decorative pattern,

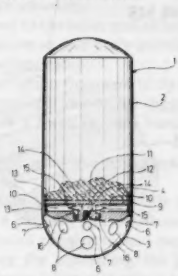
(e) said extension having a resilient covering forming a decorative pattern corresponding to the wire pattern of the head, which resilient covering comprises a material applying surface of said tool,

(f) said stem and extension being flexible to provide angular adjustment of said head relative to said handle and together with said resilient covering conforms to irregularities in the surface to which material is being applied.

4,123,974
OCEAN FLOOR MINE

Adam Mutsch, Munich; Claus Petters, Brekendorf, and Helmut Grawe, Wiegersen, all of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich, Germany

Filed Oct. 17, 1977, Ser. No. 843,138
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1976, 2647435
Int. Cl.[2] F42B *22/00*
U.S. Cl. 102—13 8 Claims

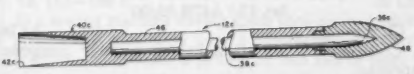


1. Ocean floor mine including a firing system and an explosive, a first container for said explosive, a second container for said firing system, said first and second containers being joined together into a single unit, wherein the improvement comprises that said explosive comprises a salt water resistant explosive of plastic-like consistency which is flowable, and said first container being separable from said explosive during the laying of the mine or when it is in position on the ocean floor so that said explosive is exposed to the pressure conditions on the ocean floor.

4,123,975
PENETRATING PROJECTILE SYSTEM AND APPARATUS

Henry H. Mohaupt, 1151 Estrella Dr., Santa Barbara, Calif. 93110

Continuation-in-part of Ser. No. 663,432, Mar. 3, 1976, abandoned. This application Aug. 3, 1977, Ser. No. 821,465
Int. Cl.[2] F42B *11/02*
U.S. Cl. 102—92.4 8 Claims



1. An apparatus for fracturing rock comprising a projectile

launcher having a muzzle portion, a barrel portion with means defining a smooth internal bore, and a breech portion,

a projectile adapted to fit into said bore and be propelled from said launcher comprising

a nose cap portion disposed proximate the front end of said projectile and fabricated from a light weight, ductile material,

an obturator portion disposed proximate the trailing end of said projectile,

a body sleeve portion fabricated from a ductile material disposed between said nose cap portion and said obturator portion,

a core body disposed in said body sleeve portion, said core body having a length to diameter ratio greater than 6 to 1 with a minimum hardness of 59 Rockwell C and a density greater than 6 grams/cc, and

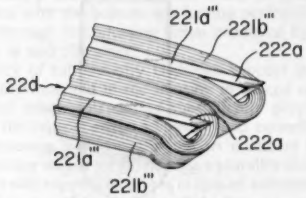
means disposed behind said obturator for propelling said projectile from said launcher.

4,123,976

ATTRACTIVE TYPE ELECTROMAGNET DEVICE FOR MAGNETIC LEVITATION RUNNING VEHICLES

Shinji Nakamura, Kawasaki, and Kiyoshi Mihirogi, Odawara, both of Japan, assignors to Japan Air Lines Company, Ltd., Tokyo, Japan

Filed Apr. 27, 1977, Ser. No. 791,218
Claims priority, application Japan, Feb. 21, 1977, 52/17220
Int. Cl.[2] B16B *13/08*
U.S. Cl. 104—148 MS **3 Claims**



1. In an attractive type electromagnet device for a magnetic levitation running vehicle including two longitudinal rows of electromagnets disposed beneath the vehicle, the rows being symmetrical to one another with respect to a vertical median plane passing through the vehicle in the direction of travel thereof, each row having a number of adjacent electromagnets, each electromagnet having an elongated core U-shaped in cross section and a coil wound around each of the legs of said U-shaped core, the improvement wherein both ends of said elongated core are slanted obliquely downwards for the entire length of the ends and the coil includes a straight portion aligned with the top of the core and bent portions downward directed at the slanted ends of the core wherein a gap not covered with the coil is formed adjacent to the upper portion of each of said slanted ends and adjacent electromagnets are closely positioned with each other at the upper pointed edges of said slanted ends of the cores and at the upper outer edges of downwardly directed bent portions of the coil.

4,123,977

PORTABLE AND CONVERTIBLE WASHSTAND

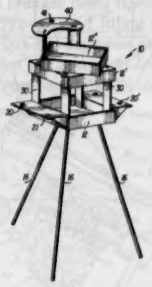
Roderick C. Heath, 6404 Greengate Hill Rd., Fayetteville, N.C. 28303

Filed Dec. 6, 1977, Ser. No. 858,073
Int. Cl.[2] A47B *85/00*
U.S. Cl. 108—25 **3 Claims**

1. Collapsible utility stand having nestable components, comprising:

(A) duplicate rectangular trays, said trays each having a flat bottom and upright sides which are connected to each other, the flat bottom of said trays each defining elongated and opposed apertures, one each of said apertures being disposed in the tray adjacent each corner thereof and spaced apart from a side of the tray;

(B) flat, tray supporting slats, each said slat having corresponding protrusions at opposite ends thereof, said protrusions being dimensioned to seat the slats in corresponding opposed apertures of the trays, to support the respective trays in superposition relative to each other;



(C) opposed shelves, each of said shelves comprising an elongated top, said top having adjacent the rear a dependent support and flange, spaced rearwardly from the support, both said flange and support engaging opposite sides of one of said trays in a frictional fit, the flange being set between an inner side of one of said trays and the slats to give rigidity to the stand;

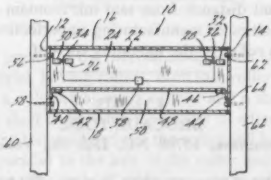
(D) plural legs, detachably retained within the lower of said trays.

4,123,978

SAFE

James J. Lentini, 2050 Mission Ridge Rd., Santa Barbara, Calif. 93103

Filed Jun. 6, 1977, Ser. No. 803,980
Int. Cl.[2] E05G *1/02*
U.S. Cl. 109—51 **1 Claim**



1. A safe for installation between a pair of wall studs, said safe comprising:

a metal enclosure having a top, bottom, front, back, and opposing side walls of a single thickness; said enclosure having a width equal to the lateral spacing between the studs and a thickness equal to approximately the thickness of the studs;

said front having an opening therein;

a metal door disposed within said opening and extending laterally substantially the entire distance between the studs; hinge means movably securing said door to said metal enclosure, said hinge means being disposed interiorly of said enclosure so as to preclude unauthorized tampering therewith, said hinge means comprising;

a pair of first cylindrical members secured to an interior surface of said door adjacent opposite sides thereof and also adjacent a third side of said door, said cylindrical

members having a longitudinal bore extending therethrough;

a pair of second cylindrical members each secured to an interior surface of said enclosure adjacent said opening and one of said first cylindrical members; said second cylindrical members having a longitudinal bore extending therethrough; and

a pair of rod members, one end of each being fixedly secured inside of said bore of selected one of said first pair of cylindrical members, the other end of said rod passing through said bore of selected one of said second pair of cylindrical members and being easily rotatable therein;

locking means on said door to secure said door in a closed position and prevent unauthorized opening thereof;

a pair of angled members secured to the interior surface of said opposing side walls and extending between said front and back walls, said angled members being disposed below said opening;

a false bottom removably engaging said angled members so as to conceal a portion of said enclosure below said false bottom;

each of said side walls further having two laterally disposed apertures therein, one pair of said apertures being disposed above said false bottom and the other pair of apertures being disposed below said false bottom; and

two pairs of laterally outwardly projecting fastening elements disposed one in each of said apertures and engaged with the confronting portion of the adjacent studs for fixedly securing the safe within the wall.

4,123,979

INCINERATOR

Allen Tesch, Lake Amy Belle, Hubertus, Wis. 53033

Filed Jun. 13, 1977, Ser. No. 805,628
Int. Cl.[2] F23G *5/08*
U.S. Cl. 110—212 **6 Claims**

1. In a multi-chamber incinerator an after burner including at least one horizontally disposed exhaust gas flow tube whose cross-sectional dimention includes an arcuate portion throughout the length thereof and a second horizontally disposed gas flow tube defined within said one gas flow tube whose cross-sectional dimension includes an arcuate portion throughout the length thereof, said tubes being interconnected for progressive gas flow, said arcuate portions of said one and said second tubes having radii of different longitudinal center lines in the same vertical plane and in converging horizontal planes in the direction of gas flow, all of the centerline axis of said second tube and substantially all of the centerline axis of said one tube disposed within said second tube whereby gases flowing through said tubes are superheated by said arcuate cross-sectional dimension of said second of said tubes having arc segments smaller than arc segments of the arcuate portion of the cross-sectional dimension of said one of the said tubes concentrating heat by the process of radiation along the longitudinal centerline of the arc of both of said tubes.

4,123,980

ROOT FEEDER

Emanuel A. Winston, 190A Skokie Valley Rd., Highland Park, Ill. 60035

Filed Dec. 17, 1976, Ser. No. 751,257
Int. Cl.[2] A01C *15/02, 5/02*
U.S. Cl. 111—92 **1 Claim**

1. An apparatus for depositing a growth altering material to a plant rooted in soil, comprising in combination:

a body member having a body aperture extending axially therethrough;

a handle member secured to one end of said body member and extending relative to said body member in a substantially orthogonal relationship;

a foot member secured to the other end of said body member and extending relative to said body member in a substantially orthogonal relationship;

a digging element extending from said body member having a substantially shovel-like region for digging into the soil upon application of a force on said handle member and said foot member;

a hopper for storing the growth altering material secured to said body member;

said hopper comprising hopper side walls tapering from a large open top to a partially open bottom;

a gate slideably mounted relative to said partially open bottom of said hopper for containing the growth altering material in said hopper when said gate is in a first position and for liberating the growth altering material in proximity to said digging element when said gate is in a second position;

urging means coacting between said gate and said hopper for biasing said gate into said first position;

guide protrusions being a single unit with said hopper and extending from opposed inside walls of said hopper for slideably mounting said gate between said guide protrusions and the top surface of said partial bottom;

a flexible connector having a first and a second end;

a movable lever mounted on said handle member; and

said flexible connector extending through said body aperture and having said first end connected to said gate and said second end connected to said movable lever to enable movement of said gate between said first and second positions in response to actuation of said movable lever.

4,123,981

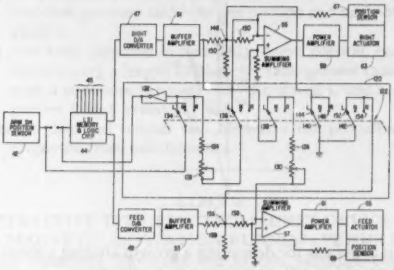
NEEDLE FEED ON ELECTRONIC SEWING MACHINE

Jack Brown, Union, N.J., assignor to The Singer Company, New York, N.Y.

Filed Dec. 8, 1977, Ser. No. 858,497
Int. Cl.[2] D05B *3/02, 27/20*
U.S. Cl. 112—158 E **10 Claims**

1. In a sewing machine having stitch forming instrumentalities positionally controlled over a predetermined range between stitches to produce a pattern of feed and of bight controlled stitches, said instrumentalities including a needle carrying bar supported for lateral jogging movement and for endwise reciprocation alternately to move a needle carried

thereby into and out of engagement with a work material being sewn; electronic means for storing pattern information; signal means operating in timed relation with the sewing machine for recovering selected pattern stitch information from said electronic storing means; and feed actuating circuit means including an actuator and bight actuating circuit means including an actuator responsive to said selected feed and bight pattern stitch information, respectively, for positioning said stitch forming instrumentalities to produce a pattern of stitches cor-



responding to the selected pattern stitch information; wherein the improvement comprises:

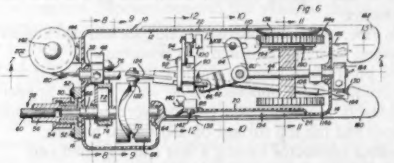
means for selectively inhibiting the utilization of said selected pattern stitch information by said actuators, means for generating special pattern stitch information, and means for initiating application of said special pattern stitch information to said actuator of said bight actuating circuit means including said actuator while said needle is in engagement with said work material and in place of said selected pattern stitch information.

4,123,982

BLIND SUTURING APPARATUS

Kenneth B. Bess, Jr., No. 32 Church St., Charleston, S.C. 29401, and Benjamin D. Alleman, 17600 NW. 82 Ct., Hialeah, Fla. 33015

Filed Apr. 5, 1977, Ser. No. 784,675
Int. Cl.[2] D05B *97/00*
U.S. Cl. 112—169 **8 Claims**



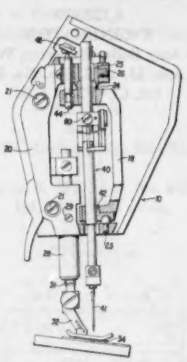
1. A hand supportable and manipulatable blind suturing apparatus including a housing having front and rear extremities, defining a front to rear extending vertical reference plane and adapted to be moved forwardly along juxtaposed marginal edge portions to be sewn together, said housing including a lower side to be disposed over and astraddle said edge portions, an arcuate needle, first means supporting said needle from said housing and forwardly of said front extremity for oscillation in a transverse plane about a front to rear extending axis generally paralleling said plane and generally coinciding with the center of curvature of said needle, said needle being shiftable, upon its oscillation, between a first retracted limit position with the pointed end of said needle disposed to one side of said plane and above said lower side and a second extended limit position with said pointed end advanced downwardly below said lower side, inwardly toward and through said plane and thereafter outwardly from the other side of said plane and upwardly to said second limit position elevated above said bottom side, a looper structure, second means supporting said looper structure from said housing for oscillation back and forth along a path extending through said vertical plane and above said lower side for coaction with said needle in its limit positions of movement, and drive means carried by said housing for frictional engagement with material upon which said bottom side is engaged and operative to forwardly advance said housing therealong, and driving means operatively connected to said needle, looper structure and drive means for synchronous driving thereof, said drive means including a pair of toothed wheels journaled from said housing on opposite sides of said vertical plane and for rotation about an axis generally normal to said vertical plane, said wheels including lower peripheral portions projecting slightly below said lower side and disposed rearwardly of said transverse plane, said first means including a main shaft extending lengthwise through said housing, journaled from said housing for oscillation about its longitudinal axis and having said arcuate needle mounted on its forward end, the rear portion of said housing including suture supply support means, said main shaft defining a longitudinal passage therethrough for receiving suture material from said suture supply support means and guidingly supporting suture material extending therethrough to the front portion of said housing.

4,123,983

RETRACTABLE NEEDLE BASTING MECHANISM

James A. Transue, Union, N.J., assignor to The Singer Company, New York, N.Y.

Filed Nov. 16, 1977, Ser. No. 852,134
Int. Cl.[2] D05B *55/16*
U.S. Cl. 112—221 **7 Claims**



1. A needle bar assembly for a sewing machine having a frame, actuating means, and a loop taker supported within said frame and driven by said actuating means, said needle bar assembly comprising:

a hollow needle bar supported by said frame for endwise reciprocation by said actuating means;

a mandrel slidably carried in one end of said hollow needle bar;

a sewing needle affixed to said mandrel;

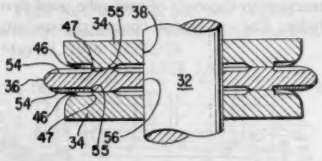
means for supporting said mandrel in a first position where said sewing needle cooperates with said loop taker in the formation of stitches and in a second position where said sewing needle does not cooperate with said loop taker, said supporting means including a flexible rod pivotably attached to said mandrel internally of said hollow needle bar and resilient means for urging said flexible rod and said mandrel to said second position; and, means for selectively initiating movement of said flexible rod and said mandrel from said first position to said second position for a selected number of endwise reciprocations of said needle bar and a return from said second position to said first position during the formation of at least one basting stitch.

4,123,984

THREAD TENSION DISCS

Lionel J. Coulombe, Matawan, N.J., assignor to The Singer Company, Elizabeth, N.J.

Filed Aug. 10, 1977, Ser. No. 823,244
Int. Cl.[2] D05B *47/04*
U.S. Cl. 112—254 **3 Claims**



1. An improved thread tension device for controlling thread on a sewing machine having means for applying tension to the thread passing therethrough, wherein the improvement comprises: at least two tension discs each having a thread bearing surface formed thereon, said thread bearing surfaces of said tension discs being formed with a pair of mating peripheral indentations, said indentations being so located as will intersect the point of entry of thread into said tension device whereby the thread will be urged toward the center of said tension device as the thread is drawn therethrough; and

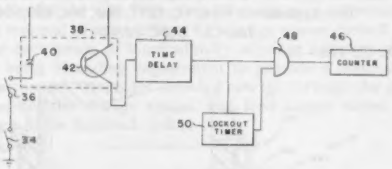
means for preventing the rotation of said tension discs.

4,123,985

MEND COUNTER

Zane Frentress, Stone Mountain, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Nov. 7, 1977, Ser. No. 848,810
Int. Cl.[2] D05C *3/00, 15/06*
U.S. Cl. 112—266 **4 Claims**



1. In a mending gun for the mending of tufted fabric which has an air operated, reciprocating hollow needle which projects through a passage in a nozzle, a yarn passage therethrough and a conduit for the introduction of air under pressure, the improvement comprising an air passage adjacent the outlet of the passage in said nozzle which forms a back pressure chamber when said nozzle is placed against a tufted fabric to be mended.

4,123,986

THREAD-CUTTER DEVICE FOR DOUBLE LOCK STITCH SEWING MACHINE

Alwin Konersmann, Bielefeld, Germany, assignor to Dürkoppwerke GmbH, Bielefeld, Germany

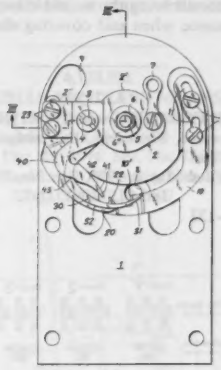
Filed May 6, 1977, Ser. No. 794,619
Claims priority, application Fed. Rep. of Germany, May 7, 1976, 7614464[U]
Int. Cl.[2] D05B *65/02*
U.S. Cl. 112—289 **6 Claims**

1. A thread-cutting device attached to the throat plate having a needle hole of a cyclic sewing machine, which comprises:

a substantially stationary arm carrying a first cutting blade in the region of said hole, said arm being attached to the throat plate to permit flexing motion of said arm in a downward direction;

means for imparting a rocking motion controlled by the sewing machine to the thread-cutting device;

an actuating lever connected to said actuating means, said lever having a hub portion and an integral arm portion extending therefrom;



a pair of thread control fingers mounted in superimposed relationship on the arm of said actuating lever adjacent to the hub portion;

a clamping and pulling member attached to the free end of the arm of the actuating lever for flexing said first cutting blade into cutting position; and

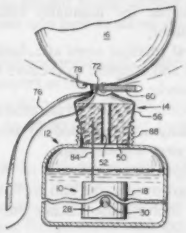
a second cutting edge on said clamping and pulling member.

4,123,987

SIGNAL BALLOON DEVICE

Richard C. Singerle, Portland, and Gail M. Denman, Hillsboro, both of Oreg., assignors to Res-Q-Devices, Inc., Hillsboro, Oreg.

Filed Aug. 15, 1977, Ser. No. 824,789
Int. Cl.[2] B64B *1/50*
U.S. Cl. 116—124 B **10 Claims**



1. A signal balloon apparatus comprising:

charge container means for containing a first substance which reacts with a second substance to produce a lighter-than-air gas, said charge container means having a plurality of apertures therethrough;

liner means for preventing the first substance from passing through the apertures;

activation container means for containing the second substance and having an opening therein for receiving said charge container means, wherein the second substance contacts the first substance through the apertures and liner means when said charge container means is received by said activation container means so that the substances react and produce the lighter-than-air gas, the lighter-than-air gas passing from said charge container means

through said liner means and apertures and into said activation container means;

balloon assembly means for trapping the gas from said activation container means;

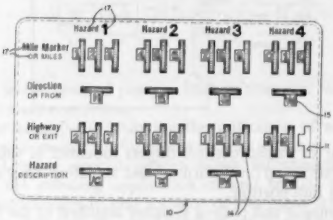
said charge container means also including covering means for preventing the second substance from contacting the first substance when said covering means is in a first position and for allowing the second substance to contact the first substance when said covering means is in a second position.

4,123,988

ROAD CONDITION INDICATOR DEVICE

David A. Brownlee, Pittsburgh, Pa., assignor to Biways, Inc., Pittsburgh, Pa.

Filed May 6, 1977, Ser. No. 794,535
Int. Cl.[2] G09F *11/02*
U.S. Cl. 116—133 **3 Claims**



1. An indicia display device comprising;

(a). a housing having generally front and back panels and having a plurality of apertures

(b). a plurality of indicia carrying wheels adapted to fit into the apertures of the front panel comprising;

(1) a generally cylindrical body member having at least one closed end,

(2) a hub extending through the center of the cylindrical body member,

(3) a plurality of grooves in the end surface of the cylindrical body member, and

(4) a radial flange attached to one end of the cylindrical body member for manually rotating the cylindrical body member;

(c). a set of first retainer arms attached to the front panel of the housing and adapted to receive the hub of the indicia carrying wheels;

(d). a set of second retainer arms attached to the back panel of the housing and adapted to receive the hub of the indicia carrying wheels; and

(e). a set of index arms attached to the housing adapted to engage the grooves in the end surface of the indicia carrying wheels thereby preventing the wheels from turning freely.

4,123,989

MANUFACTURE OF SILICON ON THE INSIDE OF A TUBE

David N. Jewett, Harvard, Mass., assignor to Mobil Tyco Solar Energy Corp., Waltham, Mass.

Filed Sep. 12, 1977, Ser. No. 832,728
Int. Cl.[2] C23C *13/08*
U.S. Cl. 118—49.5 **5 Claims**

1. Apparatus for producing a selected semiconductor material comprising:

a muffle;

a tube of a selected semiconductor material within said muffle, said tube having first and second opposite ends;

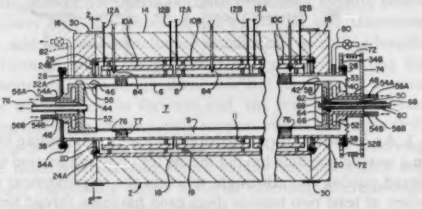
means for supporting said tube within said muffle;

means surrounding said muffle for heating said tube;

heat insulation means surrounding said muffle for substantially preventing loss of heat from said muffle;

a supply of a gaseous semiconductor compound containing said selected semiconductor material;

first and second end means for closing off the first and second opposite ends respectively of said tube, said first and second end means being adapted to provide an air-tight connection to the ends of said tube, said first end means including first and second concentric conduits for feeding



said semiconductor compound and hydrogen into the first end of said tube, said first conduit communicating directly with the interior of said tube near the center thereof, and said second conduit communicating with the interior of said tube via several discharge ports which are in said first end means and are located so as to discharge gas into the reaction chamber; and

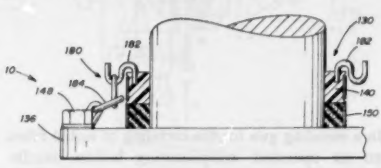
means connected to said second end mens for removing any unreacted portion of said semiconductor compound from said tube.

4,123,990

SLEEVE ASSEMBLY

John H. Wheeler, Dallas, Tex., assignor to The Texacone Company, Dallas, Tex.

Division of Ser. No. 721,984, Sep. 10, 1976, Pat. No. 4,089,137.
This application Nov. 11, 1977, Ser. No. 850,654
Int. Cl.[2] B05C *11/00*
U.S. Cl. 118—76 **3 Claims**



1. A sleeve assembly for filling pits and scratches on a piston rod of a hydraulic cylinder of the like having a stuffing box, which comprises:

(a) an annular upper ring member comprised of a rigid material and including first and second sections, the sections each having at least one aperture;

(b) an annular lower ring member comprised of a resilient material with lead particles imbedded therein and positioned between the upper ring member and a stuffing box which admits the hydraulic piston rod therethrough, the lower ring member having a void which permits the lower ring member to open and encircle the piston rod;

(c) retaining means for retaining the upper ring member to the stuffing box, the retaining means having a first coupling end portion releasably insertable in the apertures of the upper ring member sections and having a second coupling end portion releasably retained at the stuffing box;

(d) first clamp means for releasably engaging the first and second sections of the upper ring member to each other and in surrounding relationship with the piston rod; and

(e) second clamp means for releasably retaining the lower ring member in interference contact with the piston rod.

4,123,991

STRUCTURES FOR HOUSING LIVESTOCK

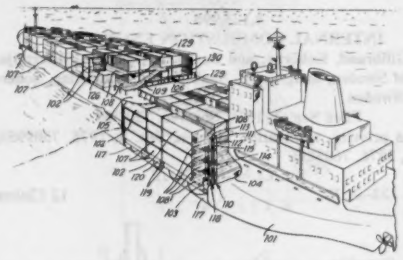
Stephen S. Kinrade, Loughton, England, assignor to Frangos Brothers & Co. Ltd., London, England

Filed Nov. 24, 1976, Ser. No. 744,944

Claims priority, application United Kingdom, Dec. 3, 1975, 49638/75; May 21, 1976, 21072/76

Int. Cl.² A01K *1/00*

U.S. Cl. 119—10 **10 Claims**



1. A structure for housing livestock such as cattle or sheep, comprising a plurality of livestock carrying modules located in two spaced, opposed, and longitudinally extending rows, a space for livestock in each livestock carrying module and a space for livestock sewage below the livestock space and capable of communicating therewith, said sewage space being integrally formed with the livestock carrying module, access module means rigidly secured to the opposed rows of modules and means permitting ingress to and egress from the livestock space of each livestock carrying module for the livestock and attendants and which opens on to the access module means, service duct means carried by each access module means and in communication with respective livestock carrying modules for the removal of sewage from the sewage spaces thereof, the service duct means of longitudinally adjacent access module means being in sealing engagement to provide a continuous service channel, means for drawing sewage through the duct means from the sewage spaces, and feed supply means for livestock in the livestock spaces.

4,123,992

CLEAN OUT SYSTEM FOR ANIMAL FACILITIES

Frank R. Laurenz, Eagle Butte, S. Dak., assignor to Agricultural Research & Development, Inc., Eagle Butte, S. Dak.

Filed Oct. 29, 1976, Ser. No. 737,160

Int. Cl.² A01K *1/00*

U.S. Cl. 119—16 **27 Claims**

1. In an animal facility which includes a circular floor area and a source of power, a clean out assembly for said circular floor area, a collecting sump for said floor area, the surface of said floor area sloping towards said sump so that a cross sectional view of said floor area is conical, a scraper assembly for said circular floor area, means mounting said scraper assembly centrally of said floor area for rotation around said floor area, said scraper assembly including a scraper blade substantially in contact with the surface of said floor area for scraping material from the surface of said floor area, said scraper blade crossing a radius line extending from the center of said floor area at an angle thereby urging material scraped from the floor by said scraper, towards said sump, and means to mount said scraper assembly in floating relationship with said floor surface whereby said scraper blade is maintained in substantial contact with said floor surface.

4,123,993

ANIMAL HANDLING MEANS

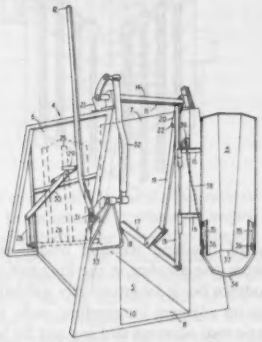
William B. Whiteley, Orange, Australia, assignor to Marie Ellen Whiteley, New South Wales, Australia

Filed Oct. 29, 1976, Ser. No. 736,858

Claims priority, application Australia, Nov. 7, 1975, 3882/75

Int. Cl.² A61D *3/00*

U.S. Cl. 119—103 **10 Claims**



1. Animal handling apparatus comprising a pair of spaced side walls defining between them an animal race;

means at the forward end of said race to prevent escape of an animal therefrom;

a first pair of spaced parallel support arms pivoted at or adjacent their upper ends to or adjacent the upper rear ends of respective said walls;

a cradle-gate means hinged to one of said support arms and adapted to operate as a gate to allow entry of an animal to said race;

means for detachably securing said cradle-gate means to the other of said support arms;

a second pair of spaced parallel support arms one end of each thereof pivoted to respective lower ends of said first support arms;

a brisket bar joining said second support arms adjacent respective other ends thereof;

means for rotating said first support arms about their pivot and further means for pivoting said second support arms relative to said first support arms.

4,123,994

APPARATUS FOR SUSPENSION OF A TUBE WALL

Karl H. Gersch, Ratingen, and Georg Lösel, Uttenreuth, both of Fed. Rep. of Germany, assignors to Balcke-Dürr Aktiengesellschaft, Ratingen, Fed. Rep. of Germany

Filed May 9, 1977, Ser. No. 794,827

Claims priority, application Fed. Rep. of Germany, May 13, 1976, 2621189

Int. Cl.² F22B *37/24*

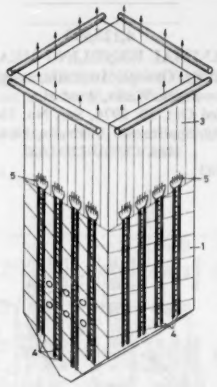
U.S. Cl. 122—6 A **4 Claims**

1. An apparatus for suspension of a tube wall, particularly a combustion chamber wall, comprising for example helically-shaped wound finned tubes which are welded gas-tight with one another extending horizontally or inclined, on an upper

part of a steam generator which is made of vertical tubes, by means of vertically extending tie rods which are connected with the tube wall over welding bridges, comprising

a plurality of tie rods arranged respectively in pairs each comprising two tie rods extending at small distance from one another defining a gap therebetween and a rear face,

a common connection piece means for securing said two tie rods of one of said pairs on the upper part of the steam generator,



a plurality of common welding bridge means disposed spaced from one another in the longitudinal direction of the tie rods for being longitudinally welded to said two tie rods only on adjacent longitudinal ends, respectively, of said two tie rods adjacent said gap and for being welded to the tube wall only at two upper and lower end points at the fins substantially perpendicularly relative to the longitudinal welding to the two tie rods whereby longitudinal expansion of the tubes and lateral expansion of the tie rods are not restrained.

4,123,995

HOT WATER OR STEAM BOILER

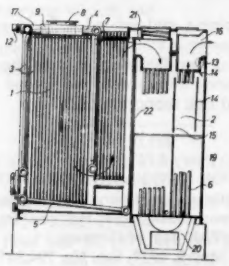
Finn U. Ek, Osby, Sweden, assignor to Osby, Varme AB, Sweden

Filed Mar. 15, 1977, Ser. No. 777,676

Claims priority, application Sweden, Apr. 1, 1976, 7603764

Int. Cl.[2] F22B *11/02*

U.S. Cl. 122—43 **8 Claims**



1. A boiler for steam or hot water comprising:

a furnace section having a chamber defined substantially in its entirety by top, bottom and sidewalls formed of closely arranged horizontally and vertically extending liquid or steam tubes respectively, said tubes thus being exposed to combustion radiation and flue gases within said chamber;

a convection section positioned horizontally of said furnace section including at least one chamber for liquid or steam;

connecting means for oeratively connecting said furnace and convection sections to permit the flow of liquid or steam between said tubes and said chamber;

means for conducting flue gases from said furnace chamber to said convection section;

and a plurality of flue gas tubes within said convection section arranged therewithin to conduct flue gases from said furnace chamber in a substantially U-shaped path through the liquid or steam chamber for heat exchange with the liquid or steam therewithin.

4,123,996

INTERNAL COMBUSTION ENGINES

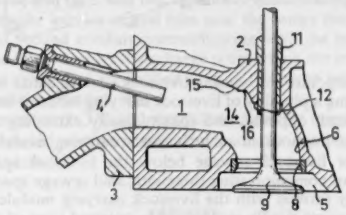
Per S. Gillbrand, Enhörna, and Bengt G. Gadefelt, Södertälje, both of Sweden, assignors to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Sep. 3, 1976, Ser. No. 720,388

Claims priority, application Sweden, Sep. 8, 1975, 7509955; May 25, 1976, 7605895

Int. Cl.[2] F02B *75/12*

U.S. Cl. 123—1 R **12 Claims**



1. A method of operating a spark-ignition internal combustion engine, characterized in that the engine is given a fixed compression ratio and is supplied with a fuel having a certain octane number and pre-selected spontaneous combustion characteristics such that the engine is only able to operate at optimum efficiency in a lower load range up to a pre-determined load level without spontaneous combustion during the combustion process of the fuel-air mixture, while in an upper load range above said pre-determined load level, the engine is consciously controlled at non-optimum efficiency by means which control the combustion of the fuel-air mixture in such a manner as to prevent spontaneous combustion during the combustion process of the fuel-air mixture, characterized in that the combustion of the fuel-air mixture is controlled above the predetermined load level by regulating the instant at which the fuel-air mixture is ignited when the engine speed is below a pre-determined value, and by controlling the volume of fuel-air mixture fed to the engine at engine speeds equal to or greater than said predetermined value.

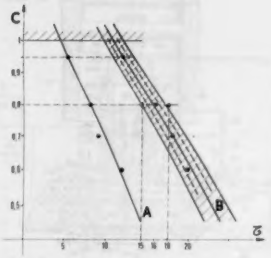
5. A spark-ignition internal combustion engine in which the compression ratio is set at a preferred fixed value, the engine being intended for use with a fuel having a certain octane number and preselected spontaneous combustion characteristics such that the engine is only able to operate at optimum efficiency in a lower load range, i.e. up to a pre-determined load level, without spontaneous combustion during the combustion process of the fuel-air mixture, the engine being provided with means for controlling the volume of fuel-air mixture fed to the combustion chamber, whereby in an upper load range, i.e. above said predetermined load level said volume is consciously controlled by said means so that the engine is operating at non-optimum efficiency in said upper load range in order to prevent spontaneous combustion, characterized in that a fixed throat is arranged in an inlet passage leading to the engine for controlling the volume of fuel-air mixture fed to the engine.

4,123,997

MOTOR ADAPTED FOR FUEL COMPRISING A PRODUCT DIFFERENT FROM MINERAL OIL PRODUCT

Roger Oswald, and Georges Agache, both of Le Havre, France, assignors to Etablissement Public dit: Agence Nationale de Valorisation de la Recherche, France

Filed Mar. 7, 1977, Ser. No. 775,039
Claims priority, application France, Mar. 8, 1976, 76 06510
Int. Cl.[2] F02B *75/12*
U.S. Cl. 123—1 A 5 Claims



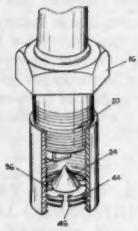
1. An internal combustion engine having a pressure device for injecting fuel into the engine cylinder or cylinders, a device for adjusting the advance of the injection in dependence on the engine load, and a controlled ignition device, said engine being arranged to use a fuel comprising a product other than a petroleum product and being characterized in that the device for adjusting the injection advance supplies, at least for engine starting, a high value of advance on the order of 180°, the device for adjusting the injection advance having means for reducing the advance when the engine load increases, and the dimensional characteristics of said engine being so determined as to supply a volumetric compression ratio between 12 and 20.

4,123,998

FLAME DEFLECTOR FOR THE AUXILIARY COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE

Leo A. Heintzelman, 4990 Burlingame, Wyoming, Mich. 49509

Filed Mar. 15, 1976, Ser. No. 667,021
Int. Cl.[2] F02B *19/18*
U.S. Cl. 123—32 K 2 Claims



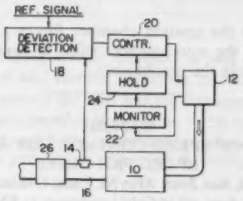
1. In an internal combustion engine having a cylinder, a cylinder head, a piston, a spark plug, and a main combustion chamber defined by said cylinder head, said cylinder, and said piston, the combination therewith of an auxiliary relatively small combustion chamber, spark plug means for igniting a combustible mixture in said auxiliary combustion chamber, and deflector means between said spark plug means and said main combustion chamber for causing the flame to fan out from said auxiliary combustion chamber into said main combustion chamber, in which the deflector means is supported by support means affixed to said cylinder head, in which said support means is fixed to a threaded bore in the cylinder head which bore also receives said spark plug means, and in which said support means comprises a transverse member having threads at its opposite ends complementary with the threads of said bore.

4,123,999

FEEDBACK AIR-FUEL RATIO CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE CAPABLE OF PROVIDING CONSTANT CONTROL SIGNAL AT START OF FUEL FEED

Masaharu Asano, Yokosuka, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Oct. 20, 1976, Ser. No. 734,115
Claims priority, application Japan, Oct. 28, 1975, 50/128908
Int. Cl.[2] F02B *3/08;* F02M *7/12;* F01N *3/08*
U.S. Cl. 123—32 EE 12 Claims



1. In a method of maintaining the air-fuel ratio of a combustible mixture fed to an internal combustion engine at a preset ratio, the method including the steps of producing a first electrical signal representing the concentration of a particular component of the exhaust gas of the engine, said concentration having dependence on the air-fuel ratio of the combustible mixture consumed in the engine, producing a second electrical signal representing a deviation of the first electrical signal from a reference signal, producing a variable control signal for the control of an air-fuel proportioning device based on the second electrical signal, the improvement comprising the step of holding the control signal constantly in a predetermined state for a predetermined amount of time immediately after the start of the feed of the combustible mixture from the air-fuel proportioning device to the engine either at starting of the engine or at the end of a temporary interruption of the feed of the combustible mixture during operation of the engine, said predetermined amount of time being determined according to a time delay in the appearance of the first electrical signal from the start of the feed of the combustible mixture.

4,124,000

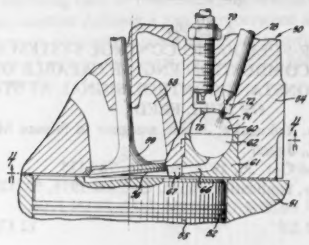
MIXED CYCLE STRATIFIED CHARGE ENGINE WITH IGNITION ANTECHAMBER

Stanley L. Gensiak, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 3, 1976, Ser. No. 738,613
Int. Cl.[2] F02B *3/02, 23/10*
U.S. Cl. 123—32 ST 3 Claims

1. The combination in an internal combustion engine of means defining a variable volume main combustion chamber, a constant volume high turbulence prechamber adjacent to and connected with said main chamber, a fixed volume low turbulence ignition antechamber at one side of said prechamber and connected therewith by an orifice, high pressure fuel injection means in said antechamber and arranged to inject the total combustion chamber fuel charge in a jet aimed from the antechamber through said orifice beginning at a time during contraction of the main chamber near its minimum volume condition, said fuel charge being directed such that a portion thereof is retained in the antechamber by air flow being forced through the orifice from the prechamber while the remainder of the fuel charge jet passes through the orifice for mixing with air in the prechamber, and spark ignition means in the antechamber

and operative to ignite the low turbulence air-fuel mixture formed therein during a period of relatively constant air-fuel ratio near the beginning of the fuel injection period whereby



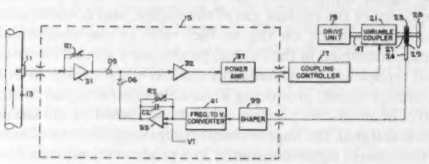
combustion in the ignition chamber forces a jet of burning gases through the antechamber orifice to ignite the turbulent fuel-air charge in the prechamber.

4,124,001

ELECTRONIC SPEED CONTROL FOR A VARIABLE SPEED FAN DRIVE

Alan J. Samuel, San Jose; Alan M. Loss, Oakland, and Hans H. Cremer, San Jose, all of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Jun. 30, 1976, Ser. No. 701,392
Int. Cl.[2] F01P *7/02*
U.S. Cl. 123—41.12 **11 Claims**



1. An electronic speed control system for a variable speed fan drive for use with a material to be cooled by a fan, said control comprising: a temperature sensitive detector positioned to sense the temperature of the material, said detector having means for developing an electrical signal having a value determined by the temperature of the material; a fan driver coupled to the fan to rotate the fan; means for varying the coupling between the fan and said fan driver in response to said electrical signal to thereby vary the speed of the fan; means for sensing the speed of the fan and for developing a speed signal having a frequency which is determined by the speed of the fan; a frequency converter coupled to receive said speed signal and providing a converted output indicative of fan speed; and means for comparing said converted output with a predetermined reference level and for providing an override signal when said converted output exceeds said predetermined reference level, said override signal being coupled to said coupling varying means for overriding said electrical signal, thereby limiting the maximum speed of the fan.

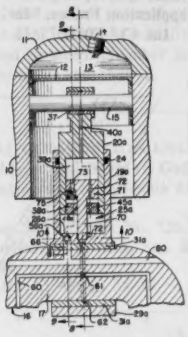
4,124,002

PRESSURE-RESPONSIVE VARIABLE LENGTH CONNECTING ROD

George W. Crise, P.O. Drawer A, Danville, Ohio 43014

Continuation-in-part of Ser. No. 707,933, Jul. 23, 1976. This application Dec. 1, 1976, Ser. No. 746,462
Int. Cl.[2] F02B *75/04*
U.S. Cl. 123—78 E **2 Claims**

1. In an internal combustion engine which includes a combustion cylinder into which combustible gases may be introduced, compressed and burned, an engine piston reciprocable in said cylinder, a crankshaft having a throw formed with an oil supply passage therein, and a variable length connecting rod comprising first and second, relatively telescoping sections connected, respectively, with said engine piston and the throw of said crankshaft and defining within said connecting rod a hydraulic pressure chamber into which oil may be introduced to lengthen said connecting rod and from which oil may be exhausted to shorten said connecting rod; that improvement



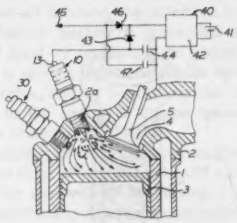
which comprises an inlet passage in the second section of said connecting rod for conducting oil from the crankshaft throw to said hydraulic pressure chamber; an exhaust passage means in the second section of said connecting rod for exhausting oil from said hydraulic pressure chamber; and means on the throw of said crankshaft for controlling the flow of oil through said exhaust passage means in accordance with the rotative position of said crankshaft throw.

4,124,003

IGNITION METHOD AND APPARATUS FOR INTERNAL COMBUSTION ENGINE

Michio Abe, Kasugai Aichi, and Naoyuki Maeda, Inyuama, both of Japan, assignors to Tokai TRW & Co., Ltd., Kasugai Aichi, Japan

Filed Oct. 15, 1976, Ser. No. 732,971
Claims priority, application Japan, Oct. 23, 1975, 50/127841; Mar. 19, 1976, 51/30311
Int. Cl.[2] F02B *33/00;* F02M *7/00;* F02P *1/00*
U.S. Cl. 123—119 E **8 Claims**



1. A method of igniting a air-fuel mixture charge in an engine, said method comprising the steps of introducing a charge of air-fuel mixture into a combustion area in the engine, establishing a corona discharge between electrodes of a first plug to effect an electrostatic stratification of the air-fuel mixture charge into a rich portion adjacent to the first plug and a lean portion spaced apart from the first plug, establishing a spark between electrodes of a second plug disposed adjacent to the first plug to effect ignition of the rich portion of the charge, and thereafter establishing a spark discharge between the same electrodes of the first plug as were utilized in the establishment

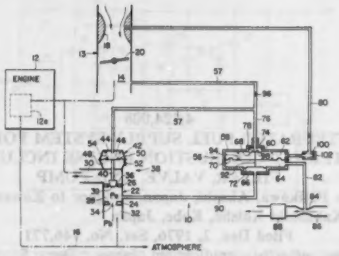
of the corona discharge to promote ignition of the relatively lean portion of the charge.

4,124,004

EXHAUST GAS RECIRCULATION CONTROL SYSTEM

Syunichi Aoyama, Yokohama, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed May 11, 1977, Ser. No. 795,970
Claims priority, application Japan, May 14, 1976, 51/55118
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **11 Claims**



1. An exhaust gas recirculation (EGR) control system in combination with an internal combustion engine including

means defining an intake passage providing communication between the atomsphere and the combustion chamber of the engine and having

a venturi formed therein, and

means defining an exhaust gas passageway providing communication between the engine and the atomsphere, said EGR control system comprising:

means defining an EGR passageway providing communication between the exhaust gas passageway and the intake passageway for recirculating thereinto exhaust gas emitted from the engine, said EGR passageway having therein a restriction for restricting said EGR passageway;

an EGR control valve disposed in said EGR passageway downstream of said restriction to define a first chamber interposed between said restriction and said EGR control valve and operable in opposite directions to increase and reduce the pressure of engine exhaust gas in said first chamber for controlling the flow of recirculated engine exhaust gas;

operating means for operating said EGR control valve in opposite directions to increase and reduce the exhaust gas pressure in said first chamber in accordance with a decrease and an increase in said exhaust gas pressure and in accordance with a decrease and an increase in a venturi vacuum in said venturi, respectively; and

means for decreasing the effect of said venturi vacuum applied to said operating means during high engine speed engine operation of the engine.

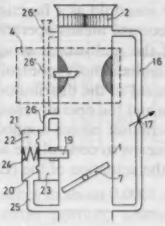
4,124,005

SUPPLEMENTARY AIR SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Jürgen Assenheimer, Vaihingen, Enz, and Johannes Brettschneider, Ludwigsburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 13, 1977, Ser. No. 796,909
Claims priority, application Fed. Rep. of Germany, May 15, 1976, 2621670
Int. Cl.[2] F02M *7/24*
U.S. Cl. 123—119 EC **8 Claims**

1. An air supply system for an internal combustion engine, said engine including an air induction tube in which are disposed, seriatim, an air flow measuring device associated with a fuel-air mixture generator and an arbitrarily settable throttle valve, said air supply system including a bypass channel for air which has an inlet in and which terminates in said induction tube downstream of said throttle valve and which includes a variable flow-restricting element operated at least in part by an electronic mixture-correction signal, the improvement in said air supply system comprising:



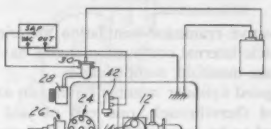
air flow throttling means, disposed in said induction tube upstream of said throttle valve, for providing a pressure gradient between the inlet and the terminus of said bypass channel and operative after engine warm-up, said air flow throttling means being connected to sources of differential pressure to provide an adjustable throttling effect.

4,124,006

ENGINE EMISSION CONTROL SYSTEM

Norman E. Rodenkirch, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jul. 7, 1977, Ser. No. 813,713
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **7 Claims**



1. An emission control system for an internal combustion engine having intake and exhaust manifolding, a carburetor mounted on the engine and having a throttle valve controlled air/fuel mixture induction passage, the passage being open at one end to air essentially at atmospheric pressure and connected at its opposite end to the engine intake manifold, a pressure sensing port in the passage adapted to be traversed by the edge of the throttle valve as the valve moves from an idle speed closed throttle position to an open throttle position whereby the port pressure varies progressively from an essentially atmospheric pressure level to the subatmospheric pressure level of the intake manifold, the system including an air pump driven by the engine providing a source of superatmospheric pressure varying as a function of engine speed, means for modifying the air pump pressure as a function of changes in engine manifold vacuum to provide a signal pressure that varies as a function of both engine speed and load, an engine ignition timing distributor breaker plate movable in opposite directions to operably advance and retard the engine ignition timing, multi-stage servo means connected to the breaker plate to move the same, an exhaust gas recirculating (EGR) system including a first conduit connecting exhaust gases to the intake manifold, an (EGR) valve in the conduit movable between a closed and open position to control flow through the conduit, second servo means connected to the (EGR) valve for moving the same between the open and closed positions, first conduit means operatively connecting the carburetor induction pas-

sage pressure port to a first part of the distributor multi-stage servo to effect a first stage part throttle movement of the same in an advance direction to provide part throttle ignition timing advance as a function of increases in the port vacuum level, second conduit means operatively connecting the air pump pressure to the (EGR) second servo means to actuate the (EGR) valve at times to an open position to permit the flow of exhaust gases to the manifold as a function of the level of the air pump pressure, control means operatively connected both to a second part of the multi-stage servo and to the second servo means for simultaneously controlling a second stage supplemental movement of the distributor multi-stage servo in an advance direction and the operativeness of the second servo means, and further conduit means connecting the signal pressure to the control means to control the actuation of the servo in timed relation to the actuation of the (EGR) valve by the air pump pressure.

4,124,007

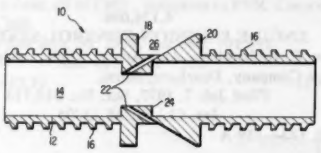
FIXED METERED ORIFICE DEVICE FOR PCV SYSTEMS OF INTERNAL COMBUSTION ENGINES

William R. Mansfield, 5 Metro Ave., Moonachie, N.J. 07074

Continuation of Ser. No. 620,174, Oct. 6, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 760,969

Int. Cl.[2] F02M *25/06*

U.S. Cl. 123—119 B **10 Claims**



1. A positive crankcase ventilation metering device for a motor vehicle internal combustion engine having a crankcase and an intake manifold, comprising:

an elongated cylinder member having an axial passageway defined therethrough, one end of said member being adapted to be connected to the crankcase of said motor vehicle internal combustion engine while the other end of said member is adapted to be connected to the intake manifold of said engine, whereby crankcase vapors may be conducted from said crankcase to said intake manifold;

fluid passageway means defined within said member for continuously fluidically communicating said axial passageway with atmosphere so as to continuously introduce air into said axial passageway,

said fluid passageway means including a plurality of fluid passages disposed about the periphery of said member, the radially outer portions of said passages being defined within the external peripheral surface of said member and open to atmosphere, the radially inner portions of said passages being defined within the internal peripheral surface of said member and open to said axial passageway,

said passages being inclined with respect to the axis of said member and extending radially inwardly from the outer peripheral surface of said member and in the direction extending from said crankcase end of said member to said manifold end of said member,

a pair of shoulders integrally formed upon said external peripheral surface of said member for limiting the longitudinal disposition upon said member of fluid hoses fluidically connecting said device to said manifold and said crankcase,

said outer portions of said passages being defined between said shoulders, said shoulders thereby defining an air channel for conducting said atmospheric air into said passageways,

the configuration of one of said shoulders being that of a truncated cone, the angle of inclination of the conical surface of said one of said shoulders coinciding with the angle of inclination of said passages,

whereby said conical surface serves as a guide for conducting said air to said passageways, and said continuous introduction of air into said axial passageway prevents the creation of a pressure differential across said crankcase as normally created by the vacuum within said intake manifold, as well as carburets said crankcase vapors so as to facilitate combustion of the same within said engine, under all engine throttle conditions.

4,124,008

INTEGRATED FUEL SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE INCLUDING FILTER, VALVE, AND PUMP

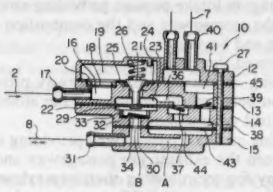
Tetsuzo Fujikawa, Akashi, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Dec. 2, 1976, Ser. No. 746,771

Claims priority, application Japan, Dec. 5, 1975, 50-165348[U]

Int. Cl.[2] F02M *39/00;* **F04B** *35/02*

U.S. Cl. 123—139 AH **7 Claims**



1. An integrated fuel supply system for an internal combustion engine, comprising:

(a) a fuel inlet passage (**16**),

(b) a first chamber communicating with said fuel inlet passage (**19**),

(c) a fuel filter (**18**) disposed between the inlet passage and the first chamber,

(d) a second chamber (**23,36**),

(e) a normally closed biased valve (**21**) disposed between the first and second chambers,

(f) a valve diaphragm (**22**) operably engaged with the valve,

(g) a pressure chamber (**20,29'**) disposed on one side of the valve diaphragm for accumulating a pressure which produces a force in the opposite direction of the spring bias of the valve thereby tending to open the value,

(h) passage means (B) for communicating with a source of pulsating pressure,

(i) a non-return valve (**30, 30'**) disposed between the passage means and the pressure chamber,

(j) a fuel pump chamber (**38**),

(k) a fuel outlet passage (**41**),

(l) valve means (**37,39**) individually disposed between the second chamber and the fuel pump chamber and between the fuel pump chamber and the fuel outlet passage,

(m) a pump diaphragm (**43**) operatively communicating on one side thereof with the pump chamber,

(n) passage means (A) for communicating the source of pulsating pressure to the other side of the pump diaphragm, and

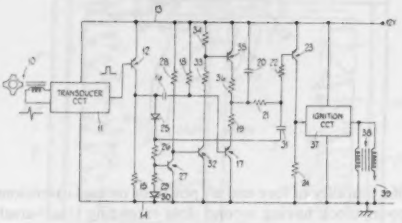
(o) a unitary housing assembly mounting and defining therein all of the above-recited structure.

4,124,009

SPARK IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

William F. Hill, Stafford, and Norman A. Jukes, Walsall, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Jul. 22, 1976, Ser. No. 707,795
Claims priority, application United Kingdom, Jul. 31, 1975, 31982/75
Int. Cl.[2] F02P 3/04
U.S. Cl. 123—148 E 5 Claims



1. A spark ignition system for an internal combustion engine comprising a transducer producing for each spark required, first and second signals separated by an interval which reduces as the engine speed increases, an ignition circuit including an ignition coil, and a triggering control circuit connecting the transducer to the ignition circuit, said triggering control circuit including first and second signal storage means, said control circuit being responsive to said first signal for supplying a first input in charging relation to said first signal storage means and causing said first input to be stored therein for a first storage period exceeding the maximum interval between sparks and being responsive to said second signal for supplying a second input in charging relation to said second signal storage means and causing said second input to be stored therein for a second storage period less than the minimum interval between sparks and limited by the occurrence of the following first signal, said triggering control circuit being such that the ignition circuit can be held switched on only during said first storage period and is overridingly held switched off during said second storage period, and operating at high engine speeds to switch off the ignition circuit for a period commencing with the second signal and of duration increasing as engine speed decreases and to decrease the ignition circuit duty cycles as engine speed decreases, and at low speeds to turn the ignition circuit on and off on receipt of said first and second signals respectively, the ignition circuit being normally turned off by the triggering circuit except when said signals are received from the transducer.

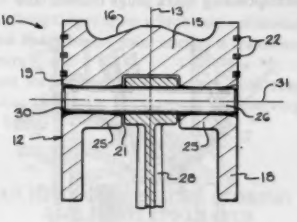
4,124,010

PISTON PIN BORE AND METHOD OF FINISHING

David F. Fiedler, Richmond, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Dec. 20, 1976, Ser. No. 752,221
Int. Cl.[2] F02F 3/00
U.S. Cl. 123—193 P 4 Claims

1. An aluminum piston comprising a piston head, a longitudinal axis, an outer peripheral surface, a hollowed center region for receiving a connecting rod, and a first piston pin bore extending through at least a portion of said piston in a direction transverse to said longitudinal axis and adapted to at least partially contain a piston pin, said piston pin adapted to be pivotally connected to said connecting rod, said bore comprising an outer end portion adjacent said outer peripheral surface, an inner end portion adjacent said hollowed center region and a center portion between said outer and inner end portions, each of said center and end portions having a generally circular cross-section, said bore being substantially smoothly curved going from said outer end portion to said inner end portion, the improvement wherein the diameters of each of said outer and inner end portions of said bore are substantially equal and are



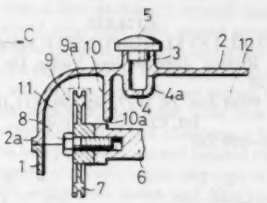
from about 0.0004 inches to about 0.0008 inches larger than the diameter of said center portion, whereby said bore has a smoothly curved hourglass configuration.

4,124,011

SYSTEM FOR PREVENTING OUTFLOW OF OIL FROM AN OIL FILLER PORT

Taiji Saito, and Masafumi Matsuoka, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 5, 1977, Ser. No. 812,678
Claims priority, application Japan, Apr. 21, 1977, 52-46250
Int. Cl.[2] F01P 1/02, 1/10
U.S. Cl. 123—195 C 4 Claims



1. In an overhead camshaft engine which includes a cylinder head, a cylinder head cover having a lower end joined to the upper end of said cylinder head intake and exhaust valves and an oil filler port, said oil filler port having a longitudinal axis extending vertically through the top wall of said cover, a horizontally disposed cam shaft provided in the top of said cylinder head and adapted to operate said intake and exhaust valves, a vertically disposed timing chain gear provided at one end of said cam shaft and a timing chain engaged with said timing chain gear, a system for preventing outflow of oil from said oil filter port, said system comprising a vertical partition wall extending downwardly from said cylinder head cover between said timing chain gear and said oil filler port to divide the interior of said cover into a first chamber having said timing chain and a second chamber having said oil filler port and said intake and exhaust valves.

4,124,012

FUEL SAVING APPARATUS AND SPARK PLUG THEREFOR

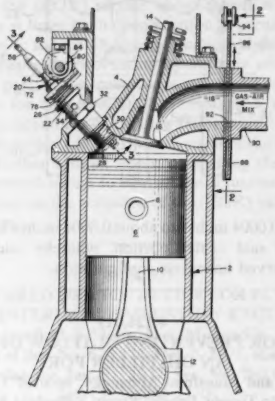
Harold L. Fuller, Jr., 325 Pennsylvania Ave., Washington, D.C. 20003

Filed Apr. 26, 1977, Ser. No. 790,911
Int. Cl.[2] F02D 13/06
U.S. Cl. 123—198 F 10 Claims

1. A fuel saving apparatus for an internal combustion engine having a plurality of cylinders each provided with a piston and a spark plug, comprising:

means for selectively preventing fuel flow to predetermined ones of said cylinders when in an operative position;

venting means having an operative position for venting each of said predetermined cylinders to atmosphere through said corresponding spark plugs therein; and



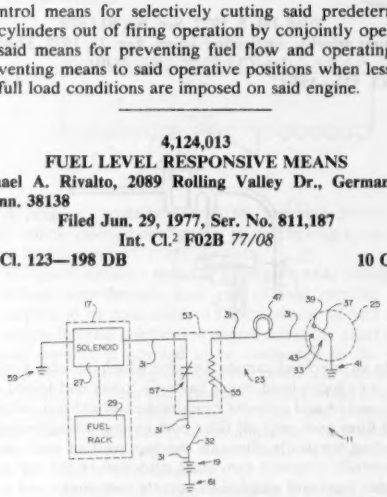
control means for selectively cutting said predetermined cylinders out of firing operation by conjointly operating said means for preventing fuel flow and operating said venting means to said operative positions when less than full load conditions are imposed on said engine.

4,124,013

FUEL LEVEL RESPONSIVE MEANS

Michael A. Rivalto, 2089 Rolling Valley Dr., Germantown, Tenn. 38138

Filed Jun. 29, 1977, Ser. No. 811,187
Int. Cl.[2] F02B *77/08*
U.S. Cl. 123—198 DB **10 Claims**



1. Means responsive to the level of fuel in a fuel tank of a motor of the type including an electrically operative cut-off means for selectively cutting off said motor and including a source of electric power, said responsive means comprising:

(a) an electric circuit for electrically joining said cut-off means and said source of electric power; and

(b) switch means electrically coupled to said electric circuit for being operatively coupled to said fuel tank of said motor and for closing when the level of fuel in said fuel tank drops below a predetermined height to thereby activate said cut-off means.

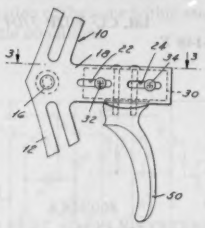
4,124,014

GRIP MOUNT FOR A COMPOUND BOW

Rex F. Darlington, 3540 Darton Rd., Hale, Mich. 48739

Filed Dec. 10, 1976, Ser. No. 749,383
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—88 **1 Claim**

1. In an archery bow structure of the type including a body portion and limbs extending therefrom to carry a nocking stretch of a bow string, that improvement in a body portion which comprises parallel body members extending in spaced relation in the draw direction of the bow from a bow handle, a stationary spacer between said body members to hold said body members in fixed spaced relation, parallel rearward extensions on each said body members having first parallel opposed slots, a handle support block located between said rearward extensions, means in said slots to locate and fix said block



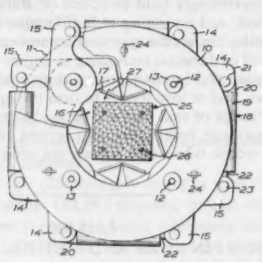
in any of a plurality of fore and aft positions on said extensions, said support block having second slots extending transversely thereof between said extensions, a grip handle positioned on the bottom of said support block, and means in said second slots to locate and fix said handle in a plurality of positions on said support block below and between said rearward extensions.

4,124,015

DEVICE FOR CUTTING IN PARTICULAR REINFORCED CONCRETE PILES

Sven G. Isaksson, Landskrona, Sweden, assignor to AB Skanska Cementgjuteriet, Malmo, Sweden

Filed Mar. 30, 1977, Ser. No. 782,771
Claims priority, application Sweden, Apr. 5, 1976, 7603983
Int. Cl.[2] B28D *1/32*
U.S. Cl. 125—23 R **6 Claims**



1. A device for cutting concrete piles and the like comprising:

(a) a frame having an opening therein to receive a concrete pile for cutting;

(b) a plurality of cutters mounted on said frame and angularly spaced apart about said opening;

(c) each of said cutters comprising a pair of opposed cutting blades mounted at the like ends of a pair of arms and extending into said opening, said arms being pivotally secured to said frame at a common point for movement towards and away from each other to move said blades towards and away from each other transversely of said opening; and

(d) means to apply force to each of said pairs of arms to move said blades towards and away from each other.

4,124,016

OVENS FOR BAKING BREAD AND LIKE PRODUCTS

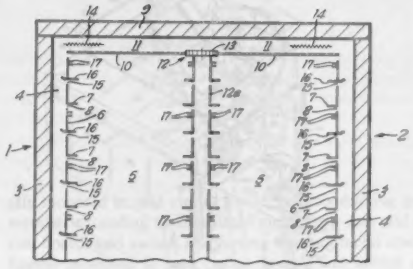
Donald A. Miller, Maribyrnong, Australia, assignor to Breadco Services Limited, London, England

Filed Jun. 1, 1977, Ser. No. 802,428

Claims priority, application United Kingdom, Jun. 8, 1976, 23613/76

Int. Cl.[2] F24C *15/32*

U.S. Cl. 126—21 A 3 Claims



1. An oven for baking bread and like products, which comprises an oven chamber, a hollow roof over the chamber, hollow walls at the sides of the chamber, bracket means secured to the side walls of the chamber and each including a horizontal part for supporting trays carrying portions of dough mixture for baking to form bread, means for circulating air from the chamber through the hollow roof and the hollow side walls and back into the chamber through horizontal slits in the side walls of the chamber, there being a first series of horizontal slits, which are located so that there is a slit beneath the horizontal part of each bracket means, and a second series of horizontal slits, slits in the second series alternating with slits in the first series, means for heating the air during such circulation, and means pivotably mounted adjacent a respective horizontal slit in the second series such that the pivotably mounted means may be moved between a first position in which the adjacent slit in the second series is closed and a second position in which the adjacent slit in the second series is open and a horizontal support is provided for one end of a tray carrying portions of dough mixture for baking into small articles such as rolls.

4,124,017

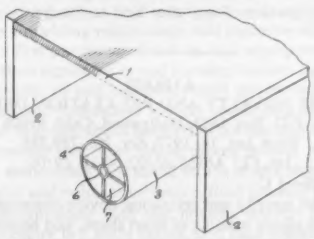
COLLIMATING SOLAR RADIATION COLLECTOR

James B. Paull, Andover, Mass., assignor to James B. Paull & Co., Inc., Boston, Mass.

Filed Jun. 17, 1977, Ser. No. 807,537

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—270 15 Claims



1. A collimating solar radiation collector comprising:

a. a transparent cover consisting of a plurality of contiguous laminated elements, said elements being curved so that the horizontal distance between the sides of adjacent elements remains substantially constant while the length of a normal between the sides increases along the path of incident light and so as to collimate sunlight incident upon said cover and direct the resulting collimated sunlight in a desired direction;

b. an absorbing target upon which said collimated sunlight is directed and wherein solar energy is transformed to thermal energy; and

c. a means for supporting said cover with respect to said absorbing target for the purpose of receiving said collimated light.

4,124,018

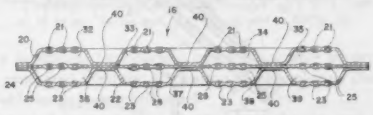
SOLAR HEAT COLLECTING, STORING AND UTILIZING APPARATUS

Orin L. Murray, Florissant, and Edwin P. Kriegesmann, Dittmer, both of Mo., assignors to Barry-Wehmiller Company, St. Louis, Mo.

Filed Oct. 14, 1976, Ser. No. 732,328

Int. Cl.[2] F24J *3/02*; F24H *7/02*

U.S. Cl. 126—271 8 Claims



1. In solar heat utilizing apparatus the combination comprising: first means to collect solar heat having fluid flow passages exposed to the sun; a heat exchanger; second means to store and discharge stored solar heat, said second means having a plurality of fluid flow passages in spaced layers and interleaved closed chambers; a piping system forming paths for fluid flow interconnecting said first means with said second means fluid flow passages and said heat exchanger; solar heat responsive phase change material in said closed chambers; a heat transfer fluid circulated in said piping system and isolated thereby from said closed chambers; and valve means disposed in said piping system selectively settable to direct said heat transfer fluid between said fluid flow passages in said first and second means and said heat exchanger in a predetermined path of said piping system.

4,124,019

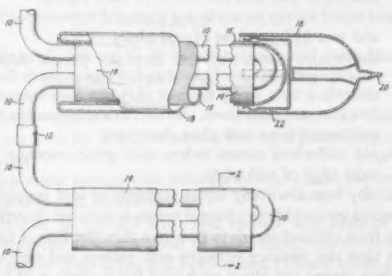
TUBULAR SOLAR COLLECTOR

Richard H. Heffelfinger, Berwyn, Pa., assignor to General Electric Company, Fairfield, Conn.

Filed Sep. 27, 1976, Ser. No. 727,158

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—271 7 Claims



1. In a solar collector having a cylindrical tubular housing closed at one end the improvement comprising:

a cylindrical fin extending longitudinally in said housing

substantially co-extensive with and in contact with said housing;

means for conveying a fluid in heat transfer relationship with said fin; and

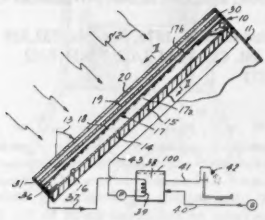
said fin is biased against the inside of said housing by a biasing means wherein said biasing means is accomplished by making the unbiased outside diameter of said fin larger than the inside diameter of said housing.

4,124,020

APPARATUS FOR COLLECTING SOLAR ENERGY

Haven D. Noble, P.O. Box 453, Lewiston, Minn. 55952

Filed Jan. 5, 1976, Ser. No. 646,605
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **5 Claims**



1. An apparatus for collecting solar energy comprising:

downwardly extending corrugated plate means having flat ridges and valleys formed therein, treated on a front face to improve solar energy absorption, when exposed to solar rays impinging thereon;

at least one protective glass sheet affixed in spaced, parallel relation above said face of said plate;

backing surface means spaced beneath said valleys of said plate by a distance from an undersurface of said plate;

a plurality of baffles each affixed to the underface of a respective one of the valleys of the corrugated plate near a gravitationally upward edge thereof;

liquid supply means at said upward edge of said plate gravitationally upwardly of said baffles and providing for liquid feeding at each location therealong corresponding to a baffle;

said baffles defining flat metering flow channel means at the underface of each valley of said downwardly extending plate and forming and directing the liquid fed thereto from said supply means as a thin substantially uniformly running film clinging by surface tension to the underface as the film runs to the gravitationally lowermost edge of the plate;

said flow channel means comprising a fixed space between said baffle and said underface of each valley;

said liquid supply means being arranged between said baffles and said undersurface of said plate;

said plate being sealed about its edges and throughout its area against passage of liquid and of liquor vapor from said underface to a space formed between said treated front face and said glass sheet, thereby, to avoid condensation of said vapor upon said glass sheet; and

liquid collection means below said gravitationally lowermost edge of said plate;

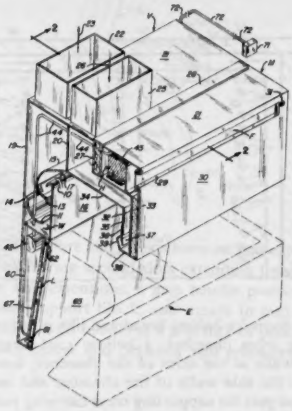
whereby heat-absorbing liquid supplied by said supply means directed into said flow channel means is directed therefrom via said flow channel means to flow in a thin, flat film of thickness less than the distance between said valleys and said backing surface means and along each said flat underface of said valleys, being attracted thereto solely by surface tension of said liquid, and absorbing solar energy collected by said plate and transferred to the liquid film and the liquid film carrying said transferred solar energy to said collection means for utilization.

4,124,021

MAKEUP AIR TEMPERING FOR GREASE EXTRACTION VENTILATOR

Victor D. Molitor, Denver, Colo., assignor to Stainless Equipment Company, Englewood, Colo.

Continuation-in-part of Ser. No. 602,685, Aug. 7, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,152
Int. Cl.[2] F24C *15/20*
U.S. Cl. 126—299 E **19 Claims**



1. Apparatus for tempering makeup air including a grease extraction ventilator for cooking equipment in a room, which cooking equipment produces a gaseous stream containing fumes, smoke and grease products, comprising:

water contact means in a passage of said ventilator, said passage extending to a duct connected to means for producing suction and said passage having an intake above said cooking equipment, said suction pulling said gaseous stream through said intake and into engagement with said water contact means, to remove said products from said stream;

air supply means including duct means connected to blower means for supplying air;

means connected with said air supply means for directing a first portion of said air as makeup air to the area of said intake of said ventilator;

a heat exchanger for producing heat exchange between air and water;

pump and pipe means for supplying water from said water contact means to said heat exchanger for heat transfer;

means connected with said air supply means for supplying a second portion of said air to said heat exchanger for heat exchange with said water; and

means connected to said heat exchanger for directing said second portion of air, after heat exchange, to a selected area.

4,124,022

HEART NOVELTY AND RELAXATION DEVICE

Sam Gross, P.O. Box 1323, Hollywood, Calif. 91604

Filed Jan. 14, 1977, Ser. No. 759,335
Int. Cl.[2] A61M *21/00;* **A61B** *19/00*
U.S. Cl. 128—1 C **3 Claims**

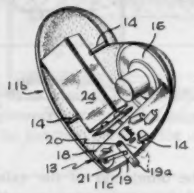
1. A heart novelty and relaxation device comprising:

a molded plastic housing of heart shape, said housing having two conformal sides separated along a median plane and adapted for press-together assembly,

a speaker within said housing,

an electrical circuit within said housing for providing to said speaker a signal to simulate the sound of the human heartbeat at a slow pulse rate,

an on-off switch for said circuit, said switch being mounted within said housing and having a flat control arm extending unobtrusively from said housing through a thin longitudinal slot formed along said median plane, and wherein said electrical circuit is mounted on a circuit board situated adjacent said median plane, said switch arm consisting of a flat strip of metal lying in said median plane and pivotally mounted to said circuit board by a conductive pivot member extending through said metal strip and said circuit board, said switch also having a spring metal contact fixedly mounted to said circuit board, said switch arm pivoting about said pivot member in said median plane into engagement with said spring metal contact to close said switch via an electrical path including said pivot member, said switch arm and contact.

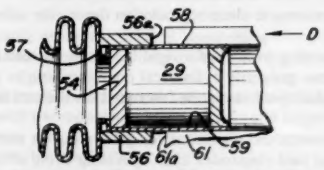


4,124,023

NON-INVASIVE NUCLEAR DEVICE FOR COMMUNICATING PRESSURE INSIDE A BODY TO THE EXTERIOR THEREOF

Lewis Fleischmann, Randallstown, Md.; Glenn A. Meyer, Brookfield, Wis., and Fred Hittman, Baltimore, Md., assignors to Hittman Corporation, Columbia, Md.

Filed Jul. 3, 1975, Ser. No. 592,718
Int. Cl.[2] A61B *5/00*
U.S. Cl. 128—2 A **24 Claims**



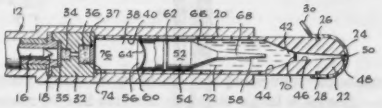
1. A pressure sensing apparatus for monitoring the fluid pressure in a body cavity comprising, in combination, a housing having an interior, a radioactive source disposed within said housing interior, radiation shield means disposed within said housing interior, means in said housing interior for yieldingly urging said radioactive source and said radiation shield means into a shielding relationship, said radiation shield means including a first portion mounted on said urging means and a second portion supported in said housing interior, said first and second portions of said radiation shield means each partially surrounding said radioactive source, said urging means being arranged to urge said shield means first portion into a cooperating relationship with said shield means second portion for yieldingly maintaining said shield means in said shielding relationship with said radioactive source, fluid pressure responsive means communicating with said housing interior for sensing the fluid pressure in a body cavity, said fluid pressure responsive means being arranged to transmit the fluid pressure in said body cavity to said housing interior for moving said first portion of said radiation shield means relative to said second portion to modify said shielding relationship between said first and second portions incrementally to produce an unshielded radioactive output from said radioactive source corresponding to the magnitude of the fluid pressure in said body cavity.

4,124,024

DISPOSABLE HYPODERMIC INJECTION AMPULE

Paul R. Schwebel, 44045 15th St. West, Lancaster, Calif. 93534, and Manuel N. Friend, 311 Bruce Ln., Turlock, Calif. 95380

Filed Mar. 3, 1977, Ser. No. 773,970
Int. Cl.[2] A61M *5/30*
U.S. Cl. 128—173 H **13 Claims**



1. In a needleless hypodermic injector operable by propellant gas generated from the detonation of an explosive charge, a disposable ampule comprising:

an elongated casing having an axial bore therein, said bore including an inwardly tapered portion at one end of said casing terminating in a fine orifice through said casing;

a cavity in said casing containing a propellant charge and in communication with said bore at the opposite end of said casing;

a gas-operated piston slidably and sealingly mounted in said bore for sliding axial movement therein in the direction of said orifice upon detonation of said charge, said piston having a tip portion conforming closely to the inwardly tapered portion of said bore;

a rupturable sealing member positioned in said tapered portion of said bore nearer said orifice, and with said piston defining a chamber in said bore for a measured dose of injectant fluid, said sealing member including means adapted to rupture under pressure exerted by said fluid in response to axial movement of said piston upon detonation of said charge, and to retrovert and deform into an hermetic seal between the tip portion of said piston and the inwardly tapered portion of said bore.

4,124,025

GAS LOCK FOR HYPODERMIC

Jamil A. R. Alrazi, 108 Mills St., Morristown, N.J. 07963

Filed Mar. 9, 1977, Ser. No. 775,798
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—218 R **11 Claims**

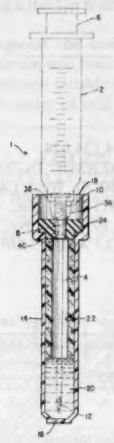
1. A gas lock for a hollow needle having a puncturing end comprising:

a hypodermic syringe comprising a syringe removably connected to said hollow needle;

a container in contact with said syringe and adapted to receive the puncturing end of said needle, said container having an open upper end portion and a closed lower end portion; and

a semi-solid substance filling at least the lower portion of said container and positioned to be penetrated by, and to envelop, the puncturing end of said needle, to prevent gas

from escaping from, or entering into, the puncturing end of said needle, and the interior portion of said container



above said semi-solid substance being at least partially filled with a porous solid material.

4,124,026

PROCEDURE AND APPARATUS FOR SCREWING IMPLANTS INTO BONES

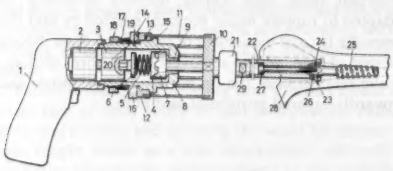
Karl Berner, Altdorf; Jürgen K. D. Koltermann, Bopfingen, and Helmut K. Grell, Aalen, all of Fed. Rep. of Germany, assignors to Deutsche Gardner-Denver GmbH, Westhausen, Fed. Rep. of Germany

Filed May 11, 1977, Ser. No. 795,682

Claims priority, application Fed. Rep. of Germany, May 14, 1976, 2621383

Int. Cl.[2] A61B *17/00, 17/18*

U.S. Cl. 128—303 R **13 Claims**



6. Apparatus for screwing a fastening element into a bone comprising a motor driven hand-held tool having an overriding clutch comprising a ratchet coupling, an elastic absorption system, which is connected, on the power take-off side of said coupling to a shaft holding a threaded pin by a sliding sleeve.

4,124,027

CONTROLLED RELEASE SUTURES

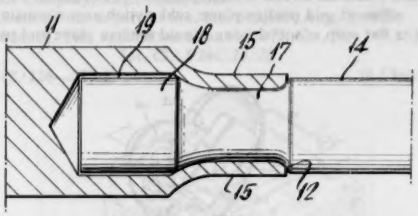
Arthur E. Boss, Mountainside, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed Mar. 4, 1977, Ser. No. 774,305

Int. Cl.[2] A61B *17/06*

U.S. Cl. 128—339 **23 Claims**

1. In a needle-suture combination having a removable needle and comprising a needle having a pointed end and a blunt end and having a blind axial opening extending into said needle from said blunt end, and a fluid swellable suture inserted into said axial opening of said needle and secured therein by swaging, the improvement comprising dimensioning the diameter of the axial opening of the needle to about 1.2 to 2.0 times the diameter of the unswollen suture inserted therein, and swaging the needle and suture within the boundaries of an area extending from the blunt end of the needle to a point between said blunt end and the blind end of said axial opening so that a segment of the tip of the suture within said axial opening and



extending from the blind end of the axial opening to the swaged portion of the needle remains substantially uncompressed, said construction of swaged needle and suture providing means of reducing the variability in the force required to remove the needle as a result of changes in suture fluid content.

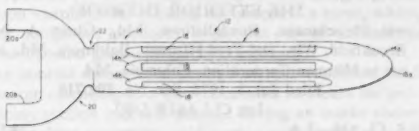
4,124,028

ELECTROEJACULATION DEVICE

John A. Gallo, Reading, Mass., assignor to Ideal Instruments, Inc., Chicago, Ill.

Filed Apr. 4, 1977, Ser. No. 784,122

Int. Cl.[2] A61N *1/38*

U.S. Cl. 128—407 **21 Claims**

1. An automatic electroejaculation device for animals comprising

A. a housing formed of a rigid insulating material having a hollow, generally cylindrical configuration,

B. a plurality of electrodes mounted on the exterior of said housing,

C. electronic circuit means for generating an output signal across said electrodes in an operating cycle of alternating stimulation periods and rest periods, where the total energy of said signal during the stimulation periods increases automatically for successive stimulation periods during said cycle and where the frequency of said signal varies automatically for at least part of each stimulation period, and

D. means for establishing an electrical connection between said circuit means and an external power source.

4,124,029

HEART PACEMAKERS

Alan W. Penn, Reading, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Oct. 18, 1977, Ser. No. 843,264

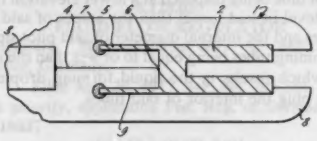
Claims priority, application United Kingdom, Oct. 20, 1976, 43577/76

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—419 P **9 Claims**

1. A heart pacemaker device including a pulser unit, an output connector and an output lead connecting the pulser unit to the output connector, the whole being encapsulated in a biologically inert material, wherein the output connector incorporates an axially extending shroud portion covering the

junction between the output lead and the output connector and there is provided an annular deformable sealing member at the free end of the shroud portion in intimate contact with the



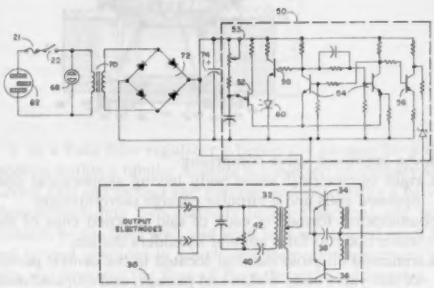
shroud portion so as to prevent a body fluid migrating along the surface of the shroud portion of the output connector from gaining access to the junction between the output lead and the output connector.

4,124,030

ELECTRO-THERAPEUTIC FARADIC CURRENT GENERATOR

Wallace A. Roberts, 88 N. Main St., Bellingham, Mass. 02019

Filed Jan. 5, 1977, Ser. No. 756,781
Int. Cl.[2] A61N *1/36*
U.S. Cl. 128—422 **1 Claim**



1. A faradic current generator, comprising
a single transistor relaxation oscillator having an adjustable firing rate;
a pair of transistors connected to operate as a Schmitt trigger, with two opposite-phased outputs and interconnected emitters, and to receive, at the interconnection of the emitters, the oscillator's output;
a single transistor buffer amplifier, having its input connected to one end of the Schmitt trigger outputs;
a second single transistor amplifier, having its input connected to the other one of the Schmitt trigger outputs, and having a light-emitting diode in the output thereof;
a power oscillator, having two transistors connected in a push-pull configuration, and connected to the output of the buffer amplifier in such a way that a pulse from the buffer amplifier triggers an alternating current burst in the output of the power oscillator for approximately the duration of the pulse; and
means for connecting electrodes to the output of the power oscillator.

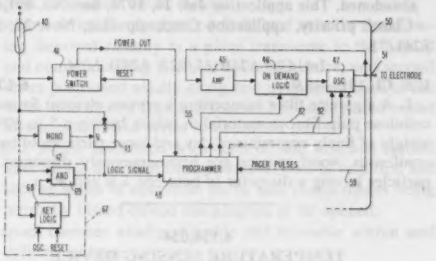
4,124,031

PROGRAMMABLE PACER

K. A. Mensink, Voorst; F. H. M. Wittkampf, Brummen, and A. C. M. Renirie, Nijmegen, all of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands

Filed Jun. 9, 1977, Ser. No. 805,037
Int. Cl.[2] A61N *1/36*
U.S. Cl. 128—419 PG **48 Claims**

1. A demand cardiac pacer having a pulse generator operating at a pulse interval determined by the programming of said pacer when it is in the asynchronous mode and by received QRS signals when it is in the demand mode, and comprising:
a. means for sensing the presence and absence of an externally applied magnetic signal;
b. first means for counting said pulse intervals when said external magnetic signal is sensed;



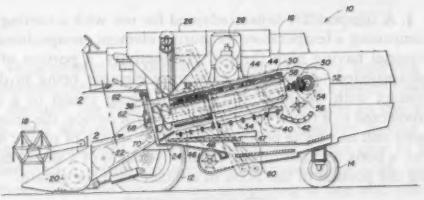
c. second means for counting said pulse intervals when the absence of said external magnetic signal is sensed;
d. control signal means for generating control signals as a function of the counts of said first and second counting means; and
e. control means for controlling at least one predetermined pacer parameter with said generated control signals.

4,124,032

ADJUSTABLE FEED CLEARANCE MEANS FOR AXIAL FLOW TYPE COMBINE

Everett C. Cowan, Jr., Parksburg, and Edwin O. Margerum, Paradise, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 17, 1977, Ser. No. 825,332
Int. Cl.[2] A01F *12/20*
U.S. Cl. 130—27 T **10 Claims**



1. An axial flow type combine provided with:
a. a casing having an infeed end arranged to receive crop material to be threshed in a substantially axial direction,
b. a rotor extending generally axially in said casing rearwardly from the infeed end thereof and having rasp bars extending therealong, and
c. a concave supported within said casing and extending at least partially along the lower surface portion of said casing for cooperation with the rasp bars on said rotor to form a threshing region in which crop material is threshed, said concave having an inlet end adjacent the infeed end of said casing, the improvement comprising in combination therewith;
d. means to provide variable spacing between said rasp bars and said concave adjacent the inlet end of said threshing region to facilitate the accommodation of varying crop material fed to said region, said means including support means for the forward ends of said rotor operable to change the normal distance between said rotor and said concave and thereby afford optimum threshing in the operation of said region regardless of the type of crop material.

4,124,033
CIGARETTE FILTER

Jaroslav Zizka, Prague; Karel Janoušek, Roztoky, and Miroslav Papánek, Kutna Hora, all of Czechoslovakia, assignors to Vyzkumny Ustav Chemickych Zarizeni, Brno, Czechoslovakia

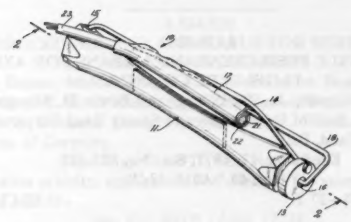
Continuation-in-part of Ser. No. 308,951, Nov. 24, 1972, abandoned. This application Jul. 24, 1974, Ser. No. 491,452
Claims priority, application Czechoslovakia, Nov. 25, 1971, 8241/71
Int. Cl.[2] A24B *15/027;* A24D *1/04*
U.S. Cl. 131—10.9 **6 Claims**

1. A cigarette filter comprising a porous element formed of cellulose pulp fibrous material in which between 5 to 40% by weight of finely comminuted dry and loose particles of bark of coniferous wood species are homogeneously dispersed, the particles having a diameter of between 1 μ and 40 μ.

4,124,034
TEMPERATURE SENSING DEVICE

Carl E. Meyerhoefer, Little Neck, and Carl H. Meyerhoefer, Huntington Station, both of N.Y., assignors to Revlon, Inc., New York, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,822
Int. Cl.[2] A45D *2/12*
U.S. Cl. 132—33 R **9 Claims**

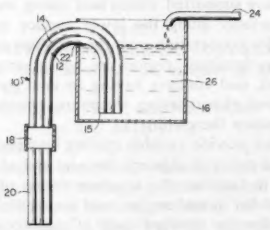


1. A temperature sensor adapted for use with a curling rod, comprising a temperature measuring element encapsulated in a material having high thermal conductivity, a portion of said encapsulated temperature measuring element being in direct contact with the hair, said element being joined to a cable connected to a time - temperature control device, the encapsulated unit and cable being covered by a sheath of plastic material, a hook secured to said sheath by means of a sleeve covering the portion of the hook in contact with the sheath.

4,124,035
SELF PRIMING SIPHON

John H. Rice, 104 Palm Ct., Santa Maria, Calif. 93454

Filed Jul. 21, 1977, Ser. No. 817,683
Int. Cl.[2] F04F *10/02*
U.S. Cl. 137—128 **9 Claims**

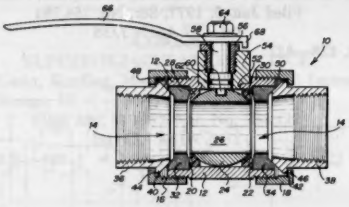


1. A self priming siphon comprising a pilot siphon tube and a plurality of auxiliary siphon tubes communicating in an arcuate path between a lower level of a liquid holding vessel and the top of a priming chamber and a plurality of downwardly extending priming tubes communicating between the bottom of the priming chamber and the atmosphere, the apex of said pilot siphon tube being disposed at a lower elevation relative to the liquid level in said vessel than the apices of said auxiliary siphon tubes and the internal diameter of said pilot siphon tube and said priming tubes being equal to or less than the maximum diameter which results in the liquid forming droplets which bridge and plug the interior of said tubes.

4,124,036
VALVE HAVING ELLIPSOID VALVE MEMBER

Phillip W. Rogers, Mexico City, Mexico, assignor to A. Dean Mammel, Dallas, Tex.

Continuation of Ser. No. 680,774, Apr. 27, 1976, abandoned, which is a continuation-in-part of Ser. No. 664,676, Mar. 8, 1976, abandoned. This application Dec. 8, 1977, Ser. No. 858,639
Claims priority, application Mexico, Jun. 10, 1975, 159171
Int. Cl.[2] F16K *5/20*
U.S. Cl. 137—375 **3 Claims**



1. An improved valve comprising:
a rigid symmetrical valve body having symmetrical open opposed ends and a circular passage therethrough,
counterbores formed in each of said opposed ends of said valve body to form annular shoulders therein,
a truncated ellipsoid member located in the central portion of said valve body within said passage, said ellipsoid member having major and minor axes and being truncated at the opposite ends of said major axis,
means defining an aperture through said ellipsoid member along said major axis,
annular resilient seats disposed within said valve body in sealing relation with opposed ends of said ellipsoid member, said resilient seats having curved interior surfaces for conforming to the exterior of said ellipsoid member and external surfaces, said seats having flexible annular lips radially inwardly disposed and capable of being flexed and deformed by movement of said ellipsoid member,
annular spacer rings each removably disposed in an end of said valve body and abutting said annular shoulders and external surfaces of said seats to urge said seats against said ellipsoid member,
union couplings rigidly connectable to the ends of said valve body for abutting said spacer rings for independently urging each of said spacer rings against one of said shoulders and one of said resilient seats, said union couplings further including means for attachment to conduits,
a handle stem rotatably extending through a side wall of said valve body and removably coupled to rotate said ellipsoid member, wherein said ellipsoid member may be rotated between open and closed positions,
said aperture along said major axis being coaxially aligned with said circular passage in said open position to allow fluid through the valve and said aperture being disposed perpendicular to said circular passage in said closed position to block the flow of fluid through the valve; and
said ellipsoid member being dimensioned to deform said annular lips of said resilient seats when in said open position by an extent greater than when in said closed position in order to reduce corrosion and abrasion of the exterior

of said ellipsoid member by inhibiting fluid from flowing between the interior of said valve body and the exterior of said ellipsoid member when in said open position.

4,124,037

FLUID FLOW REGULATOR

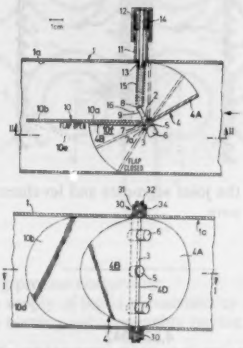
Emil Siegwart, Michael-Blatter-Str. 6, 6603 Sulzbach-Neuweiler, Germany

Filed Apr. 20, 1977, Ser. No. 789,284

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1976, 2618037

Int. Cl.[2] G05D *7/01*

U.S. Cl. 137—499 **11 Claims**



1. In a fluid flow regulator wherein the passage for a fluid medium within a tubular housing is traversed by a rotary shaft having first and second end portions and supporting a valving element including two mutually inclined sections and being turnable by the fluid with said shaft between spaced apart first and second positions in which said element respectively permits and prevents the flow of fluid through said housing, the improvement which consists in the provision of first and second thrust bearings secured to said housing and receiving the respective end portions of said shaft, at least said first bearing including means for axially stressing said shaft.

4,124,038

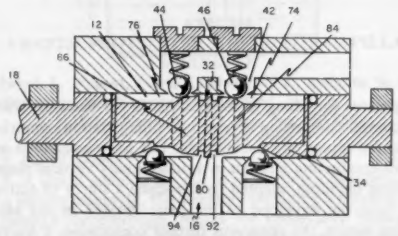
MULTIWAY HYDRAULIC VALVE

Roland W. Bonney, Box 65, R.F.D. 1, Kennebunkport, Me. 04046

Filed May 1, 1978, Ser. No. 901,427

Int. Cl.[2] F15B *13/06*

U.S. Cl. 137—596.2 **8 Claims**



1. A multiway hydraulic valve comprising:

a valve housing;

a cylindrical bore defined in said valve housing;

a first and second inlet means defined in said valve housing communicating into said cylindrical bore;

outlet means defined in said valve housing communicating into said cylindrical bore;

a first series of operation ports defined in said valve housing disposed radially in a plane transverse to the axis of and communicating into said cylindrical bore, said first series of operation ports being further positioned axially along said cylindrical bore to one side of said first and second inlet means and outlet means;

a second series of operation ports defined in said valve housing disposed radially in a plane transverse to the axis of and communicating into said cylindrical bore, said second series positioned axially along said cylindrical bore to the other side of said first and second inlet means and outlet means as said first series of operation ports;

check means associated with each of said first and second inlet means and with each operation port of said first and second series of operation ports, said check means being normally biased closed but adapted to be opened;

a spool member axially slideable and rotatable within said cylindrical bore;

operation means associated with said spool member adapted to open a selected operation port of one of said series of operation ports allowing it to vent through said outlet means while at the same time pressurizing only the operation ports of the other of said series of operation ports.

4,124,039

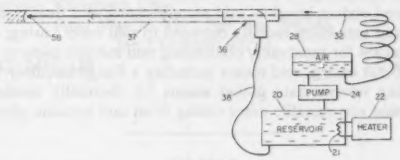
PIPE THAWING MACHINE

Richard E. St. Laurent, 14 Lavin Ct., Sanford, Me. 04073

Filed Jul. 28, 1977, Ser. No. 819,761

Int. Cl.[2] E03B *7/14*

U.S. Cl. 138—35 **2 Claims**



1. In apparatus for thawing a frozen pipe by inserting a flexible tube therein and forcing hot water from a heated reservoir through the tube while advancing the tube as the ice melts, said apparatus including a hollow member having a fitting for watertight connection to the end of the pipe to be thawed and a return connection communicating with said reservoir, a flexible tube having an opening at one end, communicating with said reservoir at the other end and adapted to be passed through said hollow member and advanced into said pipe, and means for forcing hot water from said reservoir through said tube into said pipe to thaw ice therein as said tube is advanced, the return water and melt returning to said reservoir through said return connection, the improvement comprising

a tube guiding and sealing unit arranged to be mounted within said hollow member, said unit comprising

a hollow sleeve of lesser outer diameter than the inner diameter of said member,

means for mounting said sleeve within said member,

a sealing fitting for making a watertight connection to the end of said member through which said unit is inserted,

said fitting including an opening through which said tube may pass, and

sealing means within said sleeve for sliding sealing engagement with the outer surface of said tube, whereby said tube may be advanced through said unit into the pipe to be thawed and return water and melt may flow to said return connection between the outer surface of said sleeve and the inner surface of said hollow member.

4,124,040

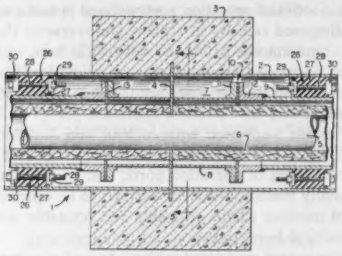
INSULATED PIPE ANCHOR ASSEMBLY

Randall J. Miller, 1051 Woodside Dr. W., Mobile, Ala. 36608

Continuation of Ser. No. 707,417, Jul. 21, 1976, abandoned, which is a division of Ser. No. 327,906, Jan. 30, 1973, Pat. No. 3,899,007. This application Sep. 13, 1977, Ser. No. 832,870

Int. Cl.[2] F16L *9/18*

U.S. Cl. 138—148 **1 Claim**



1. A pipe anchor assembly having intermittent anchor station locations and end station locations wherein said assembly comprises:

a. a central high temperature metallic fluid conduit;

b. an insulation layer surrounding said conduit;

c. radially extending metallic anchor plates emanating from said central conduit and terminating in an outer anchor means at intermittent anchor station locations;

d. a discontinuous non-metallic outer casing concentric with said central fluid conduit and spaced from said insulation layer to define an air space;

e. a metallic plate disposed about said fluid conduit at each end station location, said plate abutting said fluid conduit and extending radially outward to said outer casing; and

f. means for removably connecting said metallic plate to said outer casing, said means including a flange assembly having intermediate gasket means for thermally insulating said non-metallic outer casing from said metallic plate.

4,124,041

METHOD OF ASSEMBLING COIL SPRINGS

Larry Higgins, Carthage, Mo., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Filed Jun. 30, 1977, Ser. No. 811,608

Int. Cl.[2] B21F *27/16*

U.S. Cl. 140—3 CA **8 Claims**

1. A method of connecting adjacent springs in adjacent rows in a coil spring assembly comprising the steps of

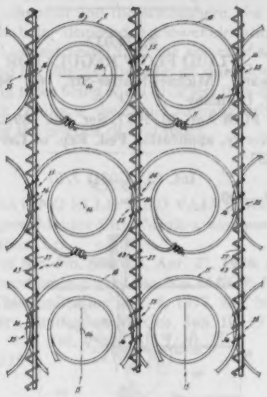
orienting a plurality of springs into a first row and a second row thereof, said rows being disposed parallel one to the other, each spring having a joint segment in the top loop thereof that is of an arcuate configuration when unconnected,

overlapping joint segments of the top loops of adjacent springs in adjacent rows one with the other to form a joint area for each spring pair,

positioning a levelizer wire from one end of said rows to the other, said levelizer wire passing through the joint area of each spring pair,

deflecting the joint segment of the top loop of at least one spring of each pair out of its unconnected arcuate configuration toward a linear configuration,

thereafter wrapping each of said joint segments and levelizer wire with a spiral lacing wire to a degree of tightness that prevents the deflected joint segment from returning completely after the deflection force thereon is released to the unstressed arcuate configuration, retaining of said deflected joint segment in a stressed arcuate configuration in the final coil spring assembly thereby providing increased firmness to that assembly over the firmness of an identical spring assembly in which neither joint segment of each spring pair and levelizer wire joint remains stressed after



wrapping of the joint segments and levelizer wire with a spiral lacing wire.

4,124,042

MANUFACTURE OF BATTERY PLATES

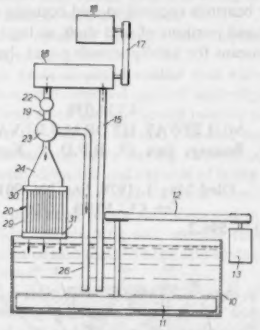
Stanley Charles Foulkes, Bolton, England, assignor to Chloride Group Limited, London, England

Division of Ser. No. 623,897, Oct. 20, 1975, Pat. No. 4,037,630. This application Jan. 10, 1977, Ser. No. 758,143

Claims priority, application United Kingdom, Oct. 18, 1974, 45241/74; Dec. 23, 1974, 55500/74

Int. Cl.[2] B65B *3/04*

U.S. Cl. 141—1.1 **33 Claims**



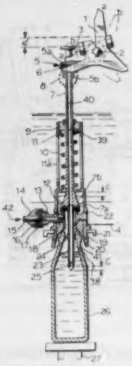
1. Apparatus for filling enveloped plates for batteries with active material comprising at least one filling station comprising means for supporting the envelope of a plate assembled on its current conducting element in a substantially vertical plane and a filling manifold adapted to introduce a slurry of active material into the envelope of the plate located in the said supporting means, the apparatus further comprising, a slurry storage tank adapted to contain a supply of active material slurry, and provided with agitating means for maintaining the active material in the storage tank in a suspension as a slurry, and delivery means for delivering the slurry from the storage tank to the manifold of a selected filling station wherein the envelope of the plate comprises at least one porous tube.

4,124,043

METHOD AND APPARATUS FOR BOTTLING

Sadao Noguchi, Nagoya, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1977, Ser. No. 801,019
Claims priority, application Japan, May 28, 1976, 51-61090
Int. Cl.[2] B65B *3/18*
U.S. Cl. 141—6 **12 Claims**



1. A bottling process comprising:
providing a supply of liquid pressurized by a supply of gas;
providing a bottling valve assembly having therein a liquid valve;
sealingly pressing the neck of a bottle against said bottling valve assembly while said liquid valve is closed;
lowering a vent tube through said bottling valve assembly into said bottle so that a lower vent hole in the lower portion of said vent tube is located within said bottle, and so that an upper vent hole in the upper portion of said vent tube is placed in communication with said supply of gas, whereby said gas flows through said vent tube into said bottle;
opening said liquid valve and allowing liquid from said liquid supply to pass through said liquid valve into said bottle until the level of liquid in said bottle closes said lower vent hole in said vent tube;
then closing said liquid valve;
then raising said vent tube until said lower vent hole is above said liquid level in said bottle and said upper vent hole is isolated from said gas supply;
then exhausting to the exterior atmosphere a gas volume enclosed between said liquid level in said bottle, said bottling valve assembly, and said liquid valve; and
thereafter removing the thus filled bottle from sealing contact with said bottling valve assembly.

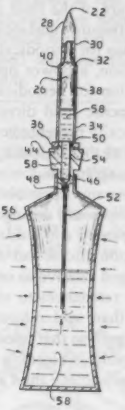
4,124,044

VENTED PROTECTIVE SHIELD FOR CAPILLARY PIPETTE

Edward L. Nugent, North Caldwell, N.J., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Filed Nov. 29, 1977, Ser. No. 855,556
Int. Cl.[2] B65B *3/04*
U.S. Cl. 141—98 **4 Claims**

1. A shield adapted for use in protecting a capillary pipette of a pipette assembly, the assembly including a housing having a passage therethrough, means for removably receiving an open end of a shield near both ends of the passage, the capillary pipette extending from one end of the passage and in fluid communication therewith, the shield comprising:
a hollow tubular body having at least one open end, the open end having means thereon for removably mounting the shield upon the receiving means of the housing, and at least one vent located on the body of the shield between the open end and the other end thereof, whereby when the shield is mounted near one end of the passage within the assembly housing, it protects the capillary pipette, and



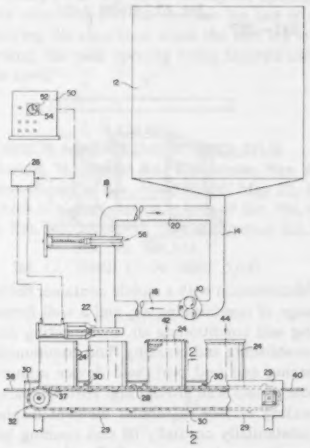
when mounted near the other end of the passage, it serves as an overflow chamber in fluid communication with the passage.

4,124,045

CONTAINER FILLING APPARATUS FOR VISCOUS MATERIAL

Michael Slywka, Parma, Ohio, assignor to The Gibson-Homans Company, Cleveland, Ohio

Filed May 23, 1977, Ser. No. 799,686
Int. Cl.[2] B65B *43/52*
U.S. Cl. 141—129 **5 Claims**



1. In apparatus for filling a succession of containers with highly viscous fluid at a high fill rate, pump means having a constant discharge rate and a sufficiently high operating discharge pressure to force the fluid at the constant discharge rate along a descending pressure gradient through a given distance in a conduit of a given diameter, fluid supply means supplying the fluid to said pump means at a reference pressure, a fluid recirculation circuit of a length not exceeding said given distance and comprising conduit of not less than said given diameter and leading from the output side of the pump means to a

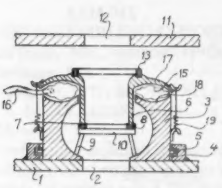
dispensing station midway along said descending pressure gradient and leading back from said dispensing station along a return path to said fluid supply means, the fluid recirculation circuit by virtue of its selected length and diameter and the highly viscous nature of the fluid requiring said pump to discharge fluid at a pressure substantially higher than said reference pressure, means for periodically presenting containers to the dispensing station, a power operated dispensing valve at the dispensing station for periodically bleeding the recirculation circuit to dispense fluid directly from the recirculation circuit into periodically presented containers, means for correlating the opening of the dispensing valve to the presentation of a container, timing means for controlling the interval the dispensing valve remains open during the presentation of the container, said pump being arranged to operate continuously during cycles of opening and closing of said dispensing valve, the fluid recirculation circuit and dispensing valve being constructed and arranged relative to one another and with regard to their respective resistances to viscous fluid flow such that pressures greater than said reference pressure continuously exist in said return path so that opening of said power operated dispensing valve results in bleeding some but not all fluid away from circulation back to the fluid supply means.

4,124,046

CONNECTING DEVICE FOR INTERMITTENT AIR FLOW

Knut A. L. Lundberg, Norrkoping, Sweden, assignor to Stal Refrigeration AB, Norrkoping, Sweden

Filed Oct. 18, 1976, Ser. No. 733,247
Claims priority, application Sweden, Oct. 16, 1975, 7511600
Int. Cl.[2] B65B *3/04*
U.S. Cl. 141—287 **3 Claims**



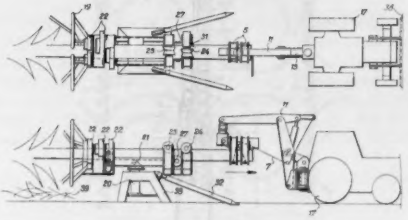
1. In combination with a mobile container having an opening for passage of conditioning air, and a wall forming a port for supplying said conditioning air, a connecting device for alternately establishing and breaking fluid communication between said opening and said port, said device comprising a collar attachable to said wall around said port, a separate body forming a sealing surface, a tubular element displaceable in the collar substantially coaxially of said opening between an extended position, where one end of said element seals around said container opening and the other end of said element is spaced from said sealing surface, whereby an air passage is formed between said other end and said sealing surface, and a retracted position where said one end is spaced from said container opening and said other end seals against said sealing surface, whereby flow of conditioning air through the tubular element is cut off, and legs connecting said separate body to said collar and forming flow paths between said legs, said paths allowing the conditioning air to pass between said port and said air passage.

4,124,047

ARRANGEMENT FOR HARVESTING TIMBER

Mirko Dressler; Vaclav Staud; Miroslav Skapa, and Miroslav Stejskal, all of Krtiny, Czechoslovakia, assignors to Vyzkumny ustav Lesniho Hospodarstvi a myslivosti, Jiloviste-Strnady, Czechoslovakia

Filed Oct. 13, 1976, Ser. No. 732,119
Int. Cl.[2] A01G *23/08*
U.S. Cl. 144—3 D **5 Claims**



1. An arrangement for harvesting trees utilizing a motor vehicle, said arrangement comprising a portable articulated grapple suspension connected to a motor vehicle and an independent cutting and delimbing unit comprising a main frame and a tree engaging frame pivotally mounted on said main frame,

said portable articulated grapple suspension comprising a jib arm having an upper end and a lower end, means for connecting said lower end to a motor vehicle, said jib arm being rotatable about a horizontal axis and a vertical axis, and an auxiliary arm pivotally connected to the upper end of the jib arm and rotatable in a vertical plane, means for controlling the positions of the jib and auxiliary arms, articulated grapple means comprising a grapple support suspended on one end of the auxiliary arm and rotatable about a horizontal axis and a vertical axis, at least two grapple arms carried by the grapple support, means for opening and closing the grapple arms in response to a first control signal,

a holding rope means for establishing the angular position of the grapple support with respect to the auxiliary arm, and means on the jib arms for tensioning said holding rope,

said main frame being adapted to be placed in a stable position on the ground, and including strut means for securing the same in said stable position,

said tree-engaging frame being pivotally mounted on said main frame for rotation about a vertical axis and a horizontal axis, said tree-engaging frame including trimming means responsive to a second control signal for trimming branches from a tree, said trimming means including movable trimming arms, at least two movable guide rollers for supporting a tree on said tree engaging frame, said rollers being movable in response to a third control signal, means adjacent the trimming arms for altering the position of branches of a tree to be harvested, and

means for generating said first, second and third control signals, so that (i) when said tree is brought into operative engagement with said tree-engaging frame by said articulated grapple suspension, said frame pivots to align itself with the tree, said guide rollers move into engagement with the tree, and said motor vehicle may pull said tree through said tree-engaging frame to cause said trimming means to delimb the tree.

4,124,048
LEAD SHARPENER

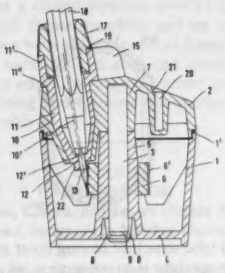
Ernst Fischer, Braiiningshof, Fed. Rep. of Germany, assignor to Möbius & Ruppert KG, Erlangen, Fed. Rep. of Germany

Filed Jun. 21, 1977, Ser. No. 808,671

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1976, 2629777

Int. Cl.² B43L *23/00*

U.S. Cl. 144—28.2 **7 Claims**



1. A lead sharpener comprising a housing formed by lower and upper housing portions which are relatively rotatable about a first rotary axis, a guide passage provided in said housing for introducing a lead to be sharpened, said passage being accentric with respect to said first rotary axis, a milling cutter in said housing, said cutter having an operating face extending at an acute angle to the longitudinal axis of said passage, a hole in said upper portion, a hollow insert member rotatable in said hole about a secondary rotary axis, said second rotary axis being offset from and parallel to said longitudinal axis.

4,124,049
FOLDABLE TANK FOR CONTAINING LIQUIDS

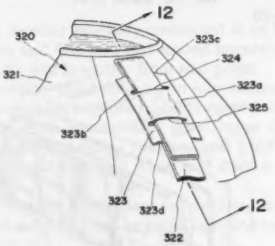
Miyoichi Yamaguchi, Yokohama, Japan, assignor to Nippon Hanpu Kogyo Co., Ltd., Yokohama, Japan

Filed May 24, 1976, Ser. No. 689,338

Claims priority, application Japan, Apr. 13, 1976, 51-45737[U]

Int. Cl.² B65D *33/38*

U.S. Cl. 150—0.5 **3 Claims**



1. A foldable tank for containing liquids, comprising:

a main bag shaped body portion of suitable flexible and waterproof material, said main body portion being in the shape of a truncated globoid when filled with liquid to take the normal shape of the contained liquid;

said main body portion including a peripheral wall formed by water-tightly overlapping and connecting peripheral pieces, and a bottom wall formed by a circular sheet;

the lower edges of said peripheral wall being water-tightly secured to said bottom wall, and the upper edges of said peripheral wall forming a liquid inlet port;

a liquid outlet port being provided in said peripheral wall;

a sheet having two slots therein affixed on two sides to said peripheral wall of said main body portion for providing an anchoring portion;

said sheet being molded of a flexible material; and

a liquid discharge hose secured at one end thereof to said outlet port, said discharge hose being anchored in said anchoring portion formed by said sheet, with said hose being slidably disposed adjacent the free end thereof within each of said slots.

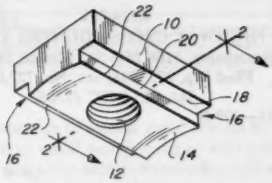
4,124,050
ACTION PIERCING FASTENER

George L. Ackerman, Twin Lakes, Wis., assignor to Action Machining Corp., Mundelein, Ill.

Continuation of Ser. No. 720,262, Sep. 3, 1976, abandoned. This application Aug. 15, 1977, Ser. No. 824,339

Int. Cl.² F16B *39/34*

U.S. Cl. 29—798 **2 Claims**



1. A self-piercing fastener and anvil combination comprising a T-shaped body the leg of which depends from between a pair of laterally-projecting arms the underside surfaces of which lie in a common plane, the said leg having flat side surfaces intersecting the common plane of the arms at right angles therewith, the said leg being the piercing portion of the fastener and having its end surface concaved from one of the flat side surfaces to the other, a flat top anvil having an opening therethrough of the same shape as the fastener leg and of a size to provide a shearing die-clearance when the said leg is entered into said opening, the said opening being tapered away from the top of the anvil.

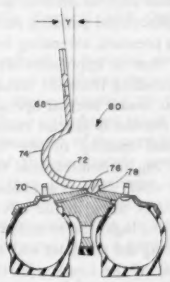
4,124,051
SHOCK ABSORBING WHEEL HUB

William E. Horton, 711 Sunset Rd., Henderson, Nev. 89015

Continuation-in-part of Ser. No. 579,476, May 21, 1976, abandoned, which is a continuation-in-part of Ser. No. 483,147, Jun. 26, 1974, Pat. No. 3,915,503. This application Jul. 9, 1976, Ser. No. 704,114

Int. Cl.² B60B *11/04*; B60C *5/00*

U.S. Cl. 152—155 **13 Claims**



5. A safety wheel for mounting a pair of pneumatic tires on a vehicle axle, comprising:

a rim, a flange on said rim positioned between said mounting

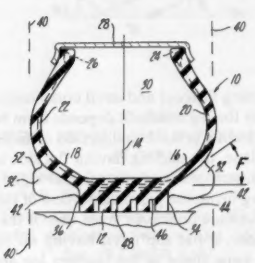
surfaces, said flange extending substantially radially from said rim, means on said rim facilitating attachment of said rim to the axle of a vehicle, a pair of parallel spaced mounting surfaces for mounting the tires in a spaced parallel relationship on the exterior of said rim, flow passage in said rim for interconnecting the interior of the tires, a socket in said rim, a flow regulator means releasably mounted in said socket for regulating the flow rate through said passage, and for selectively deflating one tire upon sudden loss of pressure in the other tire to gradually engage said flange with the roadway.

4,124,052

HIGHWAY CROSS-COUNTRY TIRE

Aaron C. Beauchamp, 1168 26th St., Moline, Ill. 61265

Filed Sep. 27, 1976, Ser. No. 727,075
Int. Cl.[2] B60C *11/06*
U.S. Cl. 152—209 B **1 Claim**



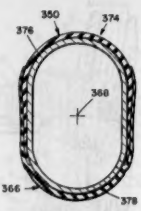
1. A combination highway cross-country tire comprising an inflatable elastomeric toroidal tire carcass having two sidewalls (**20** and **22**), a tread area (**12**), and shoulder walls (**16** and **18**) joining the tread area to the sidewalls; traction grooves in the tread area; and circumferentially spaced lugs (**32**) extending outwardly from each shoulder wall into the zones alongside the tread area; each shoulder wall being connected to the tread area radially inwardly from the plane of the traction surface defined by the tread area, whereby the lugs are spaced from the ground surface when the tire is rolling on the highway; said lugs projecting sufficient distances from the shoulder walls as to be immersed in the terrain when the tire is moving through soft terrain such as mud or snow, whereby said lugs act as terrain-displacement paddles; each shoulder wall, under normal operating pressure, extending from the tread area at an acute angle (F) that is approximately thirty degrees; each shoulder wall extending from the tread area for a substantial distance such that, under normal operating pressure, the axial thickness (C) of the tire is at least twice the tread width (D); the circumferential spacing of the lugs being appreciably greater than the lug circumferential thickness, whereby the "lug contact-lug void" ratio is appreciably less than one; the lugs being relatively thick in the circumferential and radial directions so that the lugs tend to stiffen the shoulder walls; the lugs extending along the shoulder wall surfaces to join the side edges (**34** and **36**) of the tread area, thereby reinforcing the tread-shoulder joint; the lug outer surfaces (**42**) being spaced radially inwardly from the traction surface plane (**44**), whereby severe jounce action on firm terrain hingedly flexes the shoulder walls to thereby cause the lugs to bottom on the terrain surface.

4,124,053

TWO PIECE INNER TUBE

Charles E. Grawey, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 588,732, Jun. 20, 1975, Pat. No. 4,044,085, which is a continuation-in-part of Ser. No. 385,956, Aug. 6, 1973, abandoned. This application Nov. 15, 1976, Ser. No. 741,652
Int. Cl.[2] B60C *5/04*
U.S. Cl. 152—349 **2 Claims**



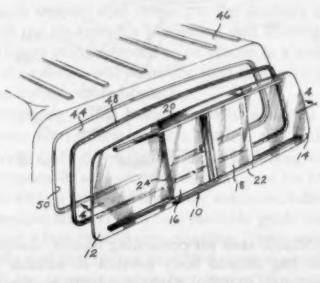
2. A toroidal tube structure having inner and outer peripheries substantially straight in cross-section taken across the body of the tube structure perpendicular to the annular axis of the tube structure, comprising a first tube portion defining a side portion and inner and outer peripheral portions, and a second tube portion defining a side portion and inner and outer peripheral portions, said inner peripheral portions of the first and second tube portions overlapping continuously and fully along the straight cross-sectional inner periphery of the tube structure, said outer peripheral portions of the first and second tube portions overlapping continuously and fully along the straight outer periphery of the tube structure, said inner and outer peripheral portions of the first tube structure being of a continuously decreasing thickness in the direction away from the side portion of the first tube portion, said inner and outer peripheral portions of the second tube portion being of a continuously decreasing thickness in the direction away from the side portion of the first tube portion.

4,124,054

WINDOW ASSEMBLY FOR A VEHICLE

Steve A. Spretnjak, Elkhart, Ind., assignor to Excel Industries, Inc., Elkhart, Ind.

Filed Sep. 21, 1977, Ser. No. 835,317
Int. Cl.[2] E06B *3/46*
U.S. Cl. 160—90 **11 Claims**



1. A window assembly for mounting in a four-sided window opening in a vehicular housing, said assembly comprising a rigidifying frame, first and second glass end panels, a glass center panel, said frame including an upper horizontal member and a spaced lower horizontal member interconnected by a pair of vertical members, said vertical members being spaced apart and inset from the ends of said upper and lower horizontal frame members, each vertical frame member and said upper and lower horizontal frame members forming a C-shaped frame part open at corresponding ends of said upper and lower

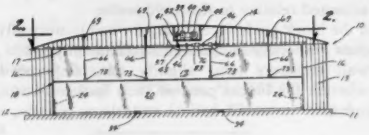
horizontal frame members, a said glass end panel carried by each C-shaped frame part, each glass end panel extending between said upper and lower horizontal frame members and from a said vertical frame member to corresponding ends of said horizontal frame members, each horizontal frame member including guide means, said glass center panel fitting between said horizontal frame members within said guide means thereof, said guide means for accommodating lateral movement of said glass center panel along said horizontal frame members between a closed position overlying the space between said vertical frame members and an opened position exposing said space between the vertical frame members, said horizontal frame members and glass end panels including cooperating exterior edges having an outline complemental to said window opening and forming the continuous peripheral edge of said assembly.

4,124,055

CANOPY DOOR

Gary Lee Aspenson, Cresco, and James Holger Andersen, Janesville, both of Iowa, assignors to Mosher Doors, Inc., Riceville, Iowa

Filed May 24, 1977, Ser. No. 799,969
Int. Cl.[2] E05F *15/00*
U.S. Cl. 160—193 **3 Claims**



1. A canopy door comprising:

a first leaf including an upper portion pivotally mounted for swinging about a fixed horizontal axis, and a lower free edge adapted to be moved between a first elevated open position and a second lowered closed position;

means connected to said first leaf for raising and lowering the lower edge thereof, thereby causing said first leaf to pivot about said fixed horizontal axis;

an extensible diagonal strut including;

a first telescoping member pivotally connected at its upper end to a fixed point inward of the door, said first member being inclined downwardly and outwardly from said fixed point;

a second member pivotally connected at its lower end to a point on said first leaf, said second member being inclined upwardly and inwardly from said point;

an intermediate pivot defining an intermediate point of pivotal connection between said first member and said second member, said intermediate point being disposed to lie below a line extending between said fixed point and said point on said first leaf when said door is in said closed position;

means connected to said strut for elevating said intermediate point thereby exerting an initial outward opening force on said first leaf;

a lower leaf, including an upper portion pivotally mounted to the lower edge of said first leaf for swinging about a horizontal axis, and a lower edge adapted to be moved between a first elevated open position and a second lowered closed position;

means connected to said lower leaf for raising and lowering the lower edge thereof;

means for guiding the lower edge of said lower leaf into vertical alignment with said first leaf as the door approaches said closed position, wherein said guiding means includes

a pair of rollers rotatably mounted at the lateral edges of said lower leaf on opposite sides thereof; and

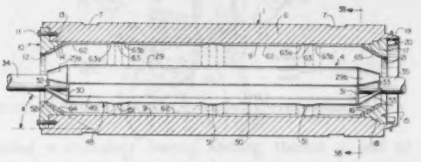
a pair of inclined tracks rigidly mounted inward of the door and adapted to engage said rollers as the door approaches said closed position.

4,124,056

METHOD AND APPARATUS FOR CENTRIFUGAL CASTING

Charles H. Noble, P.O. Box 58094, Birmingham, Ala. 35209

Filed Mar. 17, 1977, Ser. No. 778,705
Int. Cl.[2] B22D *13/02;* **B22C** *3/00, 13/10*
U.S. Cl. 164—114 **17 Claims**



1. In the production of tubular metal articles by centrifugal casting in a hollow metal mold having an active mold surface which is of circular cross-section transverse to the axis of mold rotation, the improvement comprising

introducing into the mold a quantity consisting essentially of a dry finely particulate free flowing refractory material, said refractory material being inert at the temperature of the molten metal to be cast and having

a melting point significantly higher than the temperature of the molten metal to be cast,

a specific gravity of at least 2.25, and

a particle size such that at least 95% of the particles have a maximum dimension not exceeding 105 microns;

rotating the mold to distribute said quantity of refractory material centrifugally and thereby establish over the entire active surface of the mold a layer of said refractory material which is thicker than desired for casting;

densifying the layer of refractory particulate material by rotating the mold at a rate such that the particulate refractory material is subjected to centrifugal force adequate to establish an equivalent specific gravity, determined by multiplying the actual specific gravity of the refractory material by the number of gravities of centrifugal force, of at least 7.5; contouring the inner surface of said layer, to the form desired for the article to be cast, by positioning against the inner portion of the layer, while continuing to rotate the mold, a contouring tool having a working edge which extends longitudinally of the mold and which has a longitudinal profile identical with that desired for the article to be cast,

said quantity of refractory material, and the position of said contouring tool relative to the active mold surface, being such that, after contouring, the thinnest portion of said layer will have a thickness equal to at least 5 times the maximum dimension of the particles of the predominent fraction of the particulate material and significantly greater than the maximum dimension of the largest particle in the particulate material;

rotating the mold at a casting rate such as to apply to the densified and contoured layer a centrifugal force of at least 10 gravities; and

introducing the molten metal for casting while continuing to rotate the mold at said casting rate,

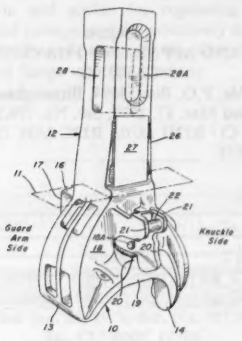
rotation of the mold being continued at said casting rate at least until the molten metal has covered the inner surface of the densified layer of refractory material.

4,124,057

COUPLER PATTERN FOR A RAILWAY VEHICLE

Frank W. Oshinsky, McKeesport, Pa., assignor to McConway & Torley Corporation, Pittsburgh, Pa.

Filed Jul. 13, 1977, Ser. No. 815,324
Int. Cl.[2] B22C *7/00, 9/22*
U.S. Cl. 164—249 **5 Claims**



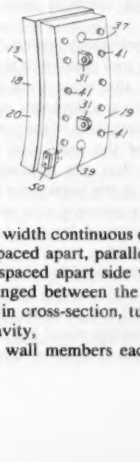
1. A drag mold pattern to produce a sand mold for a coupler casting for a railway vehicle wherein the couplder casting includes a coupler shank extending from a coupler head at a transverse plane coinciding with a horn line defined by the outer rear surface of a vertical horn wall at the top of the coupler head, said horn wall forming part of a lock chamber extending in the coupler head to a lock hole in the bottom wall thereof, the lock hole opening out of the bottom wall of the coupler casting between depending lock hole walls which project rearwardly to a plane short of the horn line to define rotary shaft walls, a rotary shaft in the coupler casting extending between the rotary shaft walls in a generally parallel relationship with the horn line, the bottom wall of the coupler shank including a recessed area to support a wear resistant surface spaced from the horn line, the improvement in said drag mold pattern comprising a drag mold pattern surface defining a substantially planar surface extending continuously from pattern walls defining said rotary shaft walls rearwardly beyond a transverse plane defining said horn line to pattern surfaces defining the forward edge of said recessed area in the bottom wall of the coupler shank.

4,124,058

SIDE WALL GUIDE FOR ADJUSTABLE WIDTH CONTINUOUS CASTING MOLD

Floyd R. Gladwin, 21000 E. River Rd., Gross Ile, Mich. 48138

Filed Aug. 2, 1977, Ser. No. 821,074
Int. Cl.[2] B22D *11/04*; B28B *7/02*
U.S. Cl. 164—436 **3 Claims**



1. In an adjustable width continuous casting mold formed of a pair of opposing spaced apart, parallel, front and rear mold walls and a pair of spaced apart side wall forming members perpendicularly arranged between the mold walls to form a roughly rectangular in cross-section, tubular, open upper and lower end casting cavity,

and with the side wall members each being formed of an interior face plate and an exterior backing plate, with the opposite upright side edges of each face plate being curved parallel to and in face-to-face line contact with its adjacent mold wall surface and with the opposite side edges of the backing plates, each being spaced inwardly from its respective adjacent mold wall surface,

and means for adjusting the position of each side wall member towards and away from each other in a horizontal direction for thereby adjusting the width of the casting cavity, the improvement comprising:

opposed sockets formed in a side edge of each backing plate, with the sockets opening towards their respective mold wall interior surfaces;

a narrow guide block secured within each socket, with each block having an exposed guide face corresponding to and being arranged to closely track a portion of its adjacent mold wall interior surface while its side wall member is moved for adjustment, so as to contact the mold wall interior surface and thereby hold its side wall member against twisting movement out of perpendicularity relative to the mold walls, to avoid flash producing gaps forming at the junctures of the side wall members and the mold wall interior surfaces;

and each block guide face being normally spaced a slight distance inwardly of its adjacent mold wall interior surface when the side wall member face plate edges are in contact with same and the side wall is perpendicularly arranged relative to the mold walls;

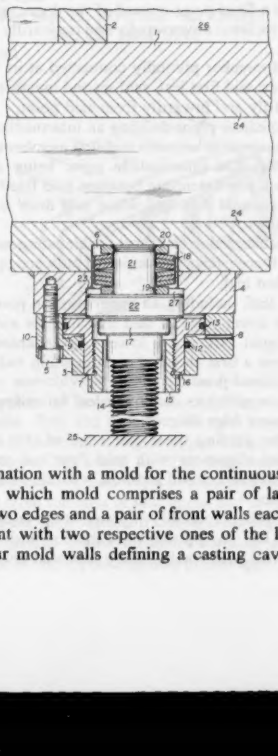
and the block guide faces being formed to normally contact their respective mold wall surfaces only when the side wall members twist slightly out of perpendicularity wherein the blocks prevent such further twisting movement.

4,124,059

MOLD FOR CONTINUOUS CASTING OF MOLTEN METAL

Bernard Roggo, Hellemes, France, assignor to Fives-Cail Babcock, Paris, France

Filed Sep. 21, 1977, Ser. No. 835,053
Claims priority, application France, Sep. 28, 1976, 76 29041
Int. Cl.[2] B22D *11/04*
U.S. Cl. 164—436 **10 Claims**



1. In combination with a mold for the continuous casting of molten metal, which mold comprises a pair of lateral walls each having two edges and a pair of front walls each arranged for engagement with two respective ones of the lateral wall edges, the four mold walls defining a casting cavity for the

molten metal, and a fixed structure supporting the walls: a mechanism for controlling the displacement of one of the front walls with respect to the respective edges of the lateral walls and for pressing the front wall tightly thereagainst, the mechanism comprising

(a) an elongated displacement device affixed to the fixed structure and extending perpendicularly to the front wall between the front wall and the fixed structure, the displacement device being operable to displace the front wall towards and away from the edges of the lateral walls,

(b) an elastic means arranged to press against the front wall, and

(c) at least one hydraulic jack arranged between the displacement device and the front wall and mounted to compress the elastic means,

(1) the jack comprising a hydraulic fluid delivery conduit for supplying hydraulic fluid thereto, and

(2) the elongated displacement device being arranged to maintain the elastic means compressed when the supply of hydraulic fluid to the jack is discontinued.

4,124,060

ROTOR

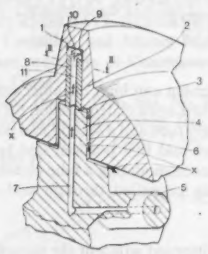
John M. Clarke, Banbury, England, assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 6, 1975, Ser. No. 602,438

Claims priority, application United Kingdom, Aug. 6, 1974, 34693/74

Int. Cl.² F01C *21/06*

U.S. Cl. 418—94 **2 Claims**



1. A rotor of a rotary piston engine in which the rotor is cooled by apparatus comprising a socket having an open end and a closed end and being provided in the rotor, a plug inserted into said socket in the rotor and defining therewith a plurality of passageways, the cooling being effected by passing a coolant liquid through said passageways of which the cross-sectional area of each is sufficiently small as to produce turbulent flow of coolant liquid therethrough and by the plug being made of a material having greater thermal conductivity than that of the material from which the rotor is made, the apparatus also comprising means defining inlet and outlet ducts communicating with said passageways, the plug fitting in the socket with negligible peripheral clearance therebetween and provided with a bore defining one of said inlet and outlet ducts for said coolant liquid and extending between one end of the plug adjacent the open end of the socket and the other end of the plug which together with the closed end of the socket defines a chamber for said coolant liquid, each passageway being in the form of a longitudinally-extending groove of small flow area defined in at least one of the peripheral walls of the plug and the socket.

4,124,061

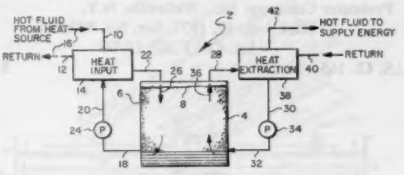
THERMAL ENERGY STORAGE UNIT

Rex C. Mitchell, Calabasas; Joseph Friedman, Encino; Richard J. Holl, Irvine, and Charles R. Easton, Palos Verdes, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 1, 1976, Ser. No. 737,361

Int. Cl.² F28D *21/00*

U.S. Cl. 165—1 **5 Claims**



5. A method of storing and recovering thermal energy comprising:

providing a container having located therein a bed of crushed rock and a liquid in a heat-exchange relationship with said rock,

establishing a thermocline in said liquid whereby the cold fluid settles to the bottom portion of the container and hot liquid rises to the top portion of the container,

introducing and extracting cold liquid adjacent the top portion of said container as desired, introducing and extracting hot liquid adjacent the bottom portion of said container as desired, said introduction and extraction of liquid in each instance being at a rate to provide a superficial velocity of said liquid through said container within the range of from about 4 to 20 feet per hour.

4,124,062

METHOD AND DEVICE FOR CONTROLLING THE TEMPERATURE IN A PREMISE

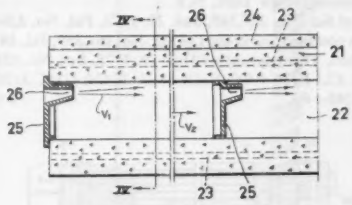
Lars O. Anderson, 12 Ropuddsvägen, Saltsjöbaden; Engelbrekt Isfält, 16 Kindstugatan, Stockholm, and Axel Rosell, 4 Uppfartsvägen, Saltsjö-Boo, all of Sweden

Continuation of Ser. No. 298,217, Oct. 17, 1972, abandoned. This application Jun. 17, 1976, Ser. No. 697,090

Claims priority, application Sweden, Apr. 21, 1971, 5097/71; Oct. 19, 1971, 13213/71

Int. Cl.² F25B *13/00*

U.S. Cl. 165—2 **5 Claims**



1. A method of attaining a comfortable temperature in a room in a building with concrete floor bearing elements during such periods in the day when the outdoor temperature is higher than said comfortable temperature and during the night when the outdoor temperature is lower than said comfortable temperature, which method includes the steps of passing air from outside the building during the night through channels in the concrete floor bearing elements so as to cool the concrete, which stored coolness the following day is transferred to the room, whereby the quantity of heat and the dimensions of the concrete floor bearing elements and the number, size and

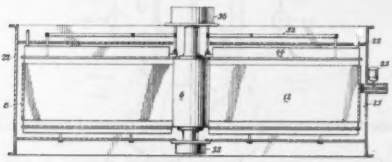
location of said channels being so adapted that the stored coolness is sufficient to maintain a comformtable temperature during the entire following day, and whereby cool air during its passage through channels of comparatively warmer bearing elements can be heated before being sucked into said room.

4,124,063

SECTOR PLATE

Richard F. Stockman, Friendship, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Aug. 19, 1977, Ser. No. 825,877
Int. Cl.[2] F28D *19/00*
U.S. Cl. 165—9 **8 Claims**



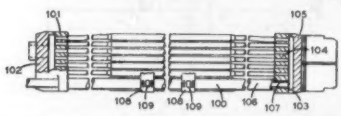
1. Rotary regenerative heat exchange apparatus having a rotor including a central rotor post and a concentric rotor shell spaced therefrom to provide an annular space therebetween, a mass of heat absorbent material carried in the annular space between the rotor post and the rotor shell, a housing surrounding the rotor in spaced relation including inlet and outlet ducts at opposite ends thereof for a heating fluid and for a fluid to be heated, a support bearing at one end of the rotor adapted to support the rotor for rotation about its axis, a guide bearing at the opposite end of the rotor adapted to preclude radial movement of the rotor post, means for rotating the rotor about its axis, a sector plate intermediate the end of the rotor and the rotor housing adapted to maintain the heating fluid separate from the fluid to be heated, support means movable in accordance with axial expansion of the rotor post adapted to support the sector plate at a point adjacent the inboard end of the rotor, and actuating means connected to the outboard edge of the sector plate adapted to deform said sector plate into a curvilinear shape that corresponds to the profile of the rotor.

4,124,064

CONSOLIDATED NUCLEAR STEAM GENERATOR

Felix S. Jabsen; Donald C. Schluderberg, and Arnold E. Paulson, all of Lynchburg, Va., assignors to The Babcock & Wilcox Company, New York, N.Y.

Division of Ser. No. 327,349, Jan. 29, 1973, Pat. No. 3,941,187, which is a continuation-in-part of Ser. No. 162,359, Jul. 14, 1971, abandoned. This application Oct. 29, 1975, Ser. No. 626,820
Int. Cl.[2] F28F *9/00;* **F22B** *1/02, 37/24;* **G21C** *3/30*
U.S. Cl. 165—69 **2 Claims**



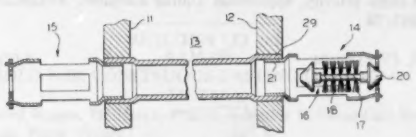
1. A steam generator modular arrangement which comprises: a support plate; a plurality of heat exchangers, each of which is supported at one end by said support plate; a manifold; a plurality of flow lines, each of which is connected at one end to said manifold and at the other end to one of said heat exchangers; said heat exchangers being positioned longitudinally staggered relative to one another; said heat exchanger having a steam header, a feedwater header spaced from said steam header, a pair of tube sheets interposed between said headers and each joined to one of said headers to form a steam chamber and a feedwater chamber respectively, a feedwater tube passing through said steam chamber to establish fluid communication with said feedwater chamber, a plurality of steam generation tubes longitudinally disposed between and secured to said tube sheets to establish fluid communication between said feedwater and steam chambers, each of said steam generation tubes including a larger diameter central tubular portion terminated at each end by a smaller diameter tubular portion, a plurality of transversely disposed spacer grids in engagement with said steam generation tubes, resilient detents formed on said spacer grids to engage surfaces on said steam generation tubes and restrain the vibration thereof, wherein said steam chamber is in fluid communication with one of said flow lines; and a shroud concentric with and disposed outside of said feedwater tube, said shroud being secured in said tube sheets.

4,124,065

APPARATUS FOR CLEANING HEAT EXCHANGER TUBES

Gordon F. Leitner, Elm Grove; Fred G. Wiegratz, Wauwatosa, both of Wis.; John C. Cleaver, deceased, late of Milwaukee, Wis. (by Harriet W. G. Cleaver, personal representative); by Laird C. Cleaver, personal representative, and by Lee Wolcott, Vice President, First Wisconsin Trust Company, personal representative, all of Milwaukee, Wis., assignors to Water Services of America, Inc., Milwaukee, Wis.

Filed Nov. 4, 1976, Ser. No. 738,889
Int. Cl.[2] F28G *1/12*
U.S. Cl. 165—95 **29 Claims**



1. A cleaning element catching chamber comprising a hollow body having a first open ended portion for communication with a heat exchanger tube and a second end portion longitudinally displaced from said first portion, said body defining an interior space for accommodating a tube cleaning element that is adapted for being propelled through said tube under the influence of fluid,

a retainer,

coupling means disposed adjacent the second end portion of said body and including a plurality of spaced apart resilient members each constructed and arranged to resiliently engage said retainer for supporting the same at said second end portion,

said retainer being constructed and arranged when mounted on the second end portion to present an obstruction to said cleaning element against removal from said body,

said resilient members being movable out of engagement with said retainer to permit the removal thereof from said body enabling access to the interior thereof and said tube.

4,124,066

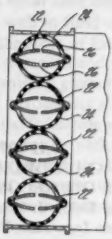
RADIATOR SHUTTER FOR ARCTIC VEHICLES

Chester J. Taylor, Warren, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 3, 1977, Ser. No. 756,162
Int. Cl.[2] F01P *7/10, 11/20*
U.S. Cl. 165—98 **1 Claim**

1. In an arctic military vehicle having a liquid-cooled engine and an air-cooled radiator for cooling the coolant after its passage through the engine: the improvement comprising a shutter mechanism located in the supply air stream for the

radiator to prevent overcooling of the coolant; said shutter mechanism comprising a plurality of rigid tubes extending transversely across the air stream, an elastomeric sleeve tightly encircling each tube along its entire length, means anchoring the ends of each sleeve to the ends of each associated tube, means for supplying pressurized fluid to each tube interior, and flow ports spaced along the length of each tube, whereby the pressurized fluid is caused to flow through the ports to balloon



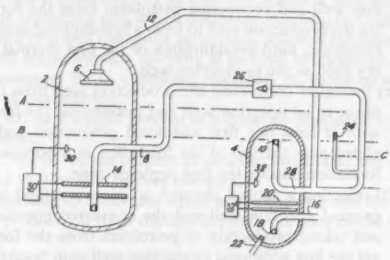
out the elastomeric sleeves, thereby reducing the air flow passage areas defined by exterior surfaces of said sleeves; each tube having an elliptical cross section oriented so that its major axis is parallel to the direction of the airstream; the flow ports in each tube being formed exclusively in laterally facing tube areas extending normal to the direction taken by the airstream, whereby the elastomeric sleeves are caused to balloon transverse to the airstream rather than parallel to the airstream.

4,124,067

PRESSURIZATION APPARATUS WITH AN INTERMEDIATE RESERVE VESSEL

Yves Bonnet, Versailles, and Michel Mabile, Jouy-en-Josas, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 1, 1976, Ser. No. 746,589
Claims priority, application France, Dec. 9, 1975, 75 37627
Int. Cl.[2] F28D *15/00*
U.S. Cl. 165—107 D **8 Claims**



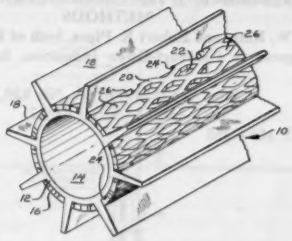
1. Pressurization apparatus for a container containing a liquid whose temperature is liable to vary, characterized in that it comprises a first enclosure or "pressurizer" having a sprinkler system located in the upper parts thereof and a first heating system and a second enclosure or "intermediate reserve vessel" having a second heating system, whereby a first pipe connects the base of said reserve vessel with said container, whilst a second unidirectional pipe passes liquid from the lower part of said pressurizer towards the upper part of said reserve vessel and a third unidirectional pipe passes the said liquid from the upper part of the said reserve vessel to the said sprinkler system.

4,124,068

HEAT EXCHANGE TUBE FOR FLUIDIZED BED REACTOR

Gregory J. Thompson, Waukegan, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed May 16, 1977, Ser. No. 797,087
Int. Cl.[2] F28F *19/00*
U.S. Cl. 165—134 R **6 Claims**



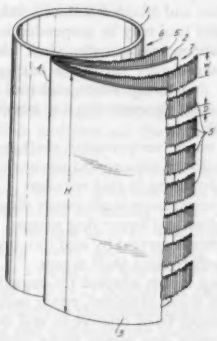
1. A heat transfer tube assembly for use in an erosive environment comprising an elongated metal tube having a plurality of outwardly extending fin portions and a plurality of wall surface portions intermediate said fin portions, metal mesh means affixed to said wall surface portions defining a plurality of small open areas having a depth of at least about 0.100 inch, said open areas being filled with an abrasion resistant refractory material to a height no greater than about one fourth the height of said fin portions so that the major portion of the surface area of the fins is exposed for heat transfer while no portion of said wall surface portions is exposed to erosion.

4,124,069

HEAT EXCHANGER WITH SPIRALLY WOUND SHEETS

Rudolf Becker, Munich, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Jul. 28, 1976, Ser. No. 709,616
Claims priority, application Fed. Rep. of Germany, Aug. 1, 1975, 2534442
Int. Cl.[2] F28D *7/10*
U.S. Cl. 165—164 **15 Claims**



1. A heat exchanger comprising within an enclosure a spirally wound coil in a plurality of turns of a pair of elongated sheet-metal bands sealed together at their short ends and formed alternately along their longitudinal edges with an open and a sealed segment, the spiral formed by said coil defining at least two axial flow passages for respective heat-exchange fluids separated from one another by at least one of said bands, and means forming respective compartments in said enclosure communicating separately with said passages at opposite axial ends of the coil to pass said heat-exchange fluids separately and

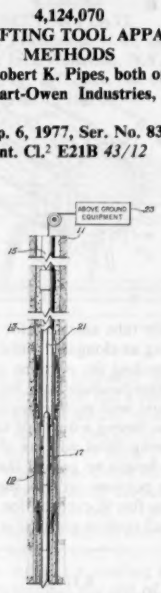
axially through said passages, open and sealed ones of such segments alternating along said longitudinal edges whereby, upon spiral coiling of the bands, the sealed segments alternate with open segments radially from the axis of the spiral and the sealed and open segments are disposed in a checkerboard pattern at opposite ends of the spiral.

4,124,070

WIRELINE SHIFTING TOOL APPARATUS AND METHODS

David W. King, and Robert K. Pipes, both of Fort Worth, Tex., assignors to Gearhart-Owen Industries, Inc., Fort Worth, Tex.

Filed Sep. 6, 1977, Ser. No. 830,390
Int. Cl.[2] E21B *43/12*
U.S. Cl. 166—255 **15 Claims**



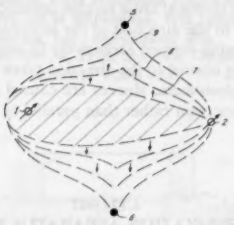
1. A wireline borehole shifting tool comprising:
a. an elongated tool body;
b. upper dog means connected to said body and adapted for engaging in the upward direction when extended, either a device to be shifted in a direction axially of said tool, or a member fixed relative to said device;
c. upper reciprocator shaft means connected to said upper dog means and adapted for connection to the wireline by which said tool may be suspended in said borehole;
i. said upper reciprocator shaft means being movable downwardly by the force of gravity to extend said upper dog means when said tool body is held against downward movement in said borehole and said wireline is slack;
ii. said upper reciprocator shaft means being movable upwardly to retract said upper dog means by application of tension to said wireline;
d. lower reciprocator shaft means disposed within said tool body below said upper dog means;
e. power means carried by said tool body connected to said lower reciprocator shaft means;
f. lower dog means adapted for engaging in the downward direction when extended, either said device to be shifted, or a member fixed relative to said device;
i. said lower dog means being connected to said lower reciprocator shaft means so that downward movement of said shaft means when said dogs are engaged will cause said lower dog means to move further away relative to said upper dog means, thus causing movement of said device to be shifted;
ii. bias means urging said lower dog means toward their extended position but permitting their movement toward the retracted position when they encounter forces acting in the radially inward direction; said shifting tool being thus adapted for shifting by virtue of force developed by said power means carried by said tool body with none of said force being applied, either upwardly or downwardly, to said wireline by which said tool may be suspended or traversed in said borehole; and said shifting tool being thus also adapted in the event of a power malfunction to be readily removed from said borehole by simply applying tension on said wireline and traversing said shifting tool upwardly out of said borehole.

4,124,071

HIGH VERTICAL AND HORIZONTAL CONFORMANCE VISCOUS OIL RECOVERY METHOD

Joseph C. Allen, and Ralph J. Korstad, both of Bellaire, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 27, 1977, Ser. No. 810,145
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—263 **13 Claims**



1. A method for recovering viscous petroleum from a subterranean, viscous petroleum-containing formation comprising:
(a) penetrating the formation with at least two spaced apart wells, one of which is completed as an injection well and one of which is completed as a production well, both wells being completed near the bottom of the formation;
(b) injecting a first thermal oil recovery fluid into the injection well and recovering petroleum from the formation via the production well to form a first depleted zone in the formation, until breakthrough of the first thermal recovery fluid at the production well;
(c) thereafter converting the production well from the first phase to an injection well and penetrating the formation with at least one first additional production well completed near the top of the formation in a portion of the formation outside the first depleted zone;
(d) injecting a second thermal oil recovery fluid into the original injection well and the converted injection well and taking production of petroleum from the formation via the first additional production well until breakthrough of the second thermal recovery fluid at the production well;
(e) penetrating the formation with at least one second additional production well located between the original injection well and original production well of the first phase of step (b) and completed near the top of the formation;
(f) converting the first additional production well of (c) to an injection well; and
(g) injecting a third thermal oil recovery fluid into all of the injection wells and producing petroleum from the second additional production well until breakthrough of the thermal oil recovery fluid at the second additional producing well.

4,124,072

VISCOUS OIL RECOVERY METHOD

David A. Redford, Fort Saskatchewan, Canada, assignor to Texaco Exploration Canada Ltd., Canada

Filed Dec. 27, 1977, Ser. No. 864,995
Int. Cl.[2] E21B *43/22, 43/24*
U.S. Cl. 166—270 9 Claims

1. In a method of recovering viscous petroleum from a subterranean, viscous petroleum-containing formation, said formation being penetrated by at least one injection well and by at least one production well in fluid communication with the formation, comprising the steps of forming a communication path between the injection well and the production well having a permeability substantially greater than the permeability of the oil formation, and introducing a viscous oil recovery fluid comprising steam into the formation via the injection well to pass through the communication path, mobilizing viscous petroleum and displacing it through the communication path toward the production well, wherein the improvement for stabilizing the communication path to prevent migration of fine mineral particles therein comprises

(a) introducing an aqueous fluid containing aluminum ions and hydroxy ions into the communication path in an amount sufficient to saturate substantially all of the communication path;

(b) allowing the aqueous solution containing aluminum ions and hydroxy ions to remain in the communication path for a period of time sufficient to ensure cementing of a substantial portion of the sand grains together;

(c) displacing the aqueous fluid containing aluminum and hydroxy ions from the communication path with a suitable fluid; and

(d) thereafter introducing the primary viscous oil recovery fluid into the stabilized communication path.

4,124,073

METHOD OF USING VISCOSITY-STABILIZED AQUEOUS SOLUTIONS

Donald R. Wier, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 9, 1976, Ser. No. 740,273
Int. Cl.[2] E21B *43/22, 43/24, 33/138*
U.S. Cl. 166—272 9 Claims

1. A process for recovering oil from a subterranean oil-bearing formation penetrated by at least one injection well and at least one producing well which comprises injecting through an input well into said formation an aqueous solution exhibiting a relatively stable solution viscosity at ambient temperature and after heating at 70° C. consisting essentially of, based on total weight of the solution:

(a) 0.001 to 2 weight percent of a nonionic polymeric component,

(b) 0.5 to 10 weight percent of an ionic surfactant, and

(c) 0.1 to 9 weight percent thiourea;

and continuing to inject said aqueous solution into said formation to produce oil from the less depleted portions of the formation.

4,124,074

METHOD FOR FORMING A GRAVEL PACK IN TAR SANDS

Joseph C. Allen, Bellaire, and Bobby G. Harnsberger, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 9, 1976, Ser. No. 748,979
Int. Cl.[2] E21B *43/04*
U.S. Cl. 166—278 2 Claims

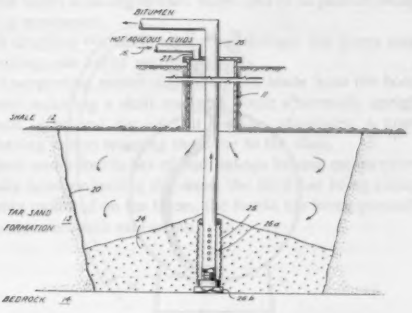
1. A process for producing bitumen from a subterranean reservoir of tar sands as unconsolidated oil bearing sands from a well having a casing extending down to the tar sand formation comprising the steps of,

(a) lowering a high pressure fluid nozzle from the well for washing a cylindrical cavity down through the tar sand formation to the bottom thereof,

(b) pouring graded gravel for building a conical shaped gravel pack of substantial height in the cavity,

(c) securing a cylindrical screen of a length slightly less than the height of the gravel pack cone on the end of the production tube,

(d) securing a screw bit to the bottom of the cylindrical screen of a diameter substantially larger than that of the screen,



(e) screwing the screw bit and the cylindrical screen down through the apex of the cone shaped gravel pack to the bottom of the tar sand formation for ensuring that the screen is buried in the sand pack,

(f) ejecting hot fluids into the cavity for melting bitumen from the tar sands, and

(g) flowing the melted bitumen through the gravel pack and screen for filtering out sand and gravel from the melted bitumen for recovering the bitumen at the surface.

4,124,075

USE OF OIL-WETTING SPACERS IN CEMENTING AGAINST EVAPORITES

Joseph U. Messenger, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 19, 1977, Ser. No. 861,756
Int. Cl.[2] E21B *33/14*
U.S. Cl. 166—293 10 Claims

1. In the drilling of a well with a water base drilling mud, a method of cementing pipe against an evaporite section penetrated by said well, comprising the steps of:

(a) flowing an oil-wetting liquid through the annular space formed intermediate said pipe and the wall of said well to oil-wet said evaporite section;

(b) forming a pumpable cement slurry comprised of hydraulic cement, sodium chloride in an amount of at least about 18 weight percent based on mixing water, an ionization control agent in an amount up to 1.5 weight percent based on cement, mixing water and weighting agent in an amount to provide a density of said cement slurry within the range of about 15.8 to 21 pounds per gallon;

(c) positioning said slurry in the annular space formed intermediate said pipe and said evaporite section; and

(d) maintaining said slurry in said annular space to allow said slurry to set and bond said pipe to said evaporite section.

4,124,076

FIRE EXTINGUISHER

Robert E. Howard, Springdale Lake, Belton, Mo. 64012

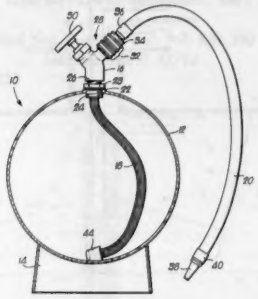
Filed Aug. 18, 1977, Ser. No. 825,674
Int. Cl.[2] A62C *11/00*
U.S. Cl. 169—30 6 Claims

1. A rechargeable fire extinguishing apparatus, comprising: a closed dispensing container including an outlet therein,

and being adapted to store a flowable fire extinguishant under pressure therein;

a valve member operably connected with said outlet for both selectively controlling the flow of said extinguishant out of said container through said outlet of the latter whereby to dispense said extinguishant, and for selectively controlling the flow of said extinguishant from a recharging source of the latter into said container through said outlet therein whereby to recharge said apparatus;

nozzle means for directing the flow of said extinguishant as



the latter is dispensed from said apparatus to extinguish a fire; and

means connected with said valve member for releasably coupling said nozzle means with said outlet through said valve means to allow dispensing of said extinguishant from said apparatus,

said coupling means being also adapted for releasably coupling said recharging source of extinguishant with said outlet through said valve means to allow recharging of said apparatus when said nozzle means is uncoupled from said apparatus.

4,124,077

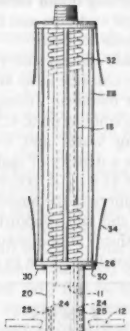
SPRINKLER HEAD WITH WALL PENETRATING MEANS

Timothy T. Barge, Suitland, Md., assignor to Thomas J. Masano, Suitland and John T. Masano, Brandywine, both of, Md., part interest to each

Filed May 16, 1977, Ser. No. 797,342

Int. Cl.[2] A62C *37/08*

U.S. Cl. 169—70 **12 Claims**



1. A sprinkler head for positioning on the opposite side of a penetrable screen from the area to be fire-protected comprising:

a supply tube for conveying a fire-extinguishing fluid;

means for penetrating and rupturing the screen for dispersion of the fluid from the tube into the area to be protected;

means for impacting against said penetrating means; and

means for restraining said impacting means in ready position of the sprinkler head, said restraining means including a portion rupturable on command.

4,124,078

AGRICULTURAL IMPLEMENTS

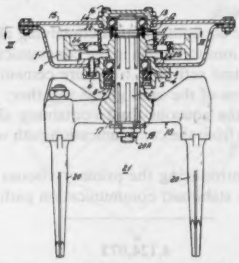
Cornelis van der Lely, Zug, Switzerland; Ary van der Lely, Maasland, and Cornelis J. G. Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N.V., Maasland, Netherlands

Filed May 28, 1976, Ser. No. 690,880

Claims priority, application Netherlands, Jun. 2, 1975, 7506493; Jun. 12, 1975, 7506984

Int. Cl.[2] A01B *33/06*

U.S. Cl. 172—59 **18 Claims**



1. An agricultural implement comprising a frame and a plurality of soil-working members journalled in a portion of said frame, said soil-working members being rotatably mounted on corresponding upwardly extending shafts and said shafts being supported by said frame portion through at least one respective bearing connection, driving means engaging said soil-working members and said driving means comprising intermeshed gears within said frame portion and below the bearing connections that support said shafts, protective means located between said bearing connections and the gears of said driving means and said protective means being positioned to intercept broken bearing fragments from fouling said gears, said protective means comprising a chamber positioned beneath each bearing connection and said chamber substantially surrounding the respective shaft and gear, said chamber being connected to the hub of said gear with release means.

4,124,079

DRIVEN IMPLEMENT CONNECTED TO ROCKABLE MOTOR OF A VEHICLE

Harold J. Crow, R.R. 2, Box 191, Milford, Ill. 60953

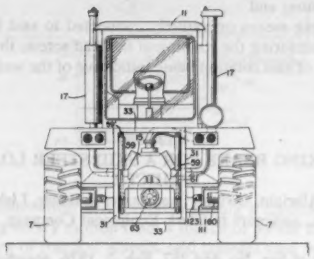
Filed Sep. 30, 1976, Ser. No. 728,197

Int. Cl.[2] A01B *33/08, 63/108;* B60K *9/00*

U.S. Cl. 172—114 **1 Claim**

1. A farm implement including, in combination, a motive power unit including drive wheels so that said unit may travel over the ground, a motor housed in said unit, a tiller connected to and pushed by said unit as it travels forwardly, and said tiller in operative position being in contact with the soil, said unit including a chassis and a cradle is provided and said motor is fixed thereto, said cradle being connected to said chassis and being rockable on a transverse horizontal axis with respect thereto, said motor being rockable with said cradle, a drive shaft from said motor to said tiller for the operation of the tiller

thereby, said tiller being detachably fixed to said cradle in operative position movable therewith as the cradle is rocked, means operably connected at one end to said cradle and at the other end to said chassis of said motive power unit for causing rocking of said cradle to lift said tiller from the ground when said cradle is rocked upwardly to thereby maintain the drive shaft in alignment with said motor and tiller, said chassis having side frame members, pivoting means connected to said side frame members and extending therebetween and operably connected to said cradle adjacent the rear end thereof whereby said cradle may rock on said pivoting means and said means which is operably connected at one end to said cradle is connected at its other end to a supporting member fixed to said



chassis and disposed in a plane above the point of connection of said one end of said means, said supporting member including a pair of transversely spaced upstanding elements being fixed to said chassis and extending therebaove, a spanning element fixed to the tops of said upstanding elements and extending therebetween in a plane above the point of connection of said one end of said means, and said means being pivotally connected at its other end to said spanning element of said supporting member, and said supporting member is of generally rectangular configuration and said transversely spaced upstanding elements extend a distance below said chassis and a lower spanning element is fixed to the bottoms of said upstanding elements and extends therebetween in a plane below said cradle.

4,124,080

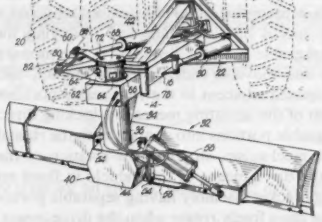
TRACTOR MOUNTED SCRAPER BLADE

James E. McCanse, Oregon, Ill., assignor to Hesston Corporation, Hesston, Kans.

Division of Ser. No. 663,670, Mar. 4, 1976, Pat. No. 4,061,194. This application Jan. 19, 1977, Ser. No. 760,659

Int. Cl.[2] E02F *3/76*

U.S. Cl. 172—447 **15 Claims**



1. In a material handling assembly:

a swingable boom;

a first unit for swinging the boom in opposite directions;

an elongated scraper blade having means pivotally supporting the same on the boom for swinging movement therewith and with respect thereto;

a second unit; and

a coupling between the second unit and the blade for swinging the latter in opposite directions relative to the boom during actuation of the second unit, to and from a position placing its longitudinal axis in perpendicular relationship to the normal course of travel of said assembly in all positions of swinging movement of the boom, and for placing said axis substantially parallel to said course when the boom is swung toward either end of its path of swinging movement,

said coupling including a four bar linkage, the boom comprising one bar of said linkage,

said supporting means suspending the blade from the boom and including a shaft rotatable about a normally upright axis, a second bar of said linkage comprising a crank having means securing the same to the shaft,

a third and a fourth bar of said linkage having means pivotally interconnecting the same, the third bar being swingably mounted on the boom, the fourth bar being pivotally connected with said crank.

4,124,081

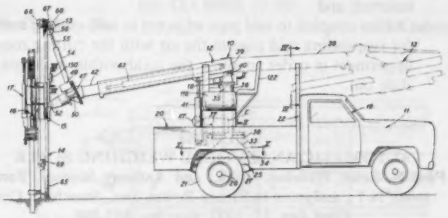
POST DRIVING MACHINE

Robert F. Deike, Cheyenne, Wyo., assignor to Foresight Industries, Cheyenne, Wyo.

Continuation-in-part of Ser. No. 575,462, May 7, 1975, Pat. No. 4,050,526. This application Apr. 8, 1976, Ser. No. 674,901

Int. Cl.[2] E04H *17/26*

U.S. Cl. 173—28 **20 Claims**



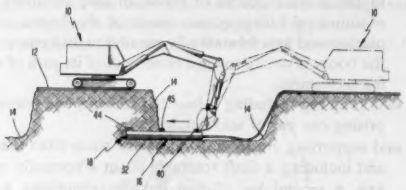
1. A mobile hydraulic driving machine which comprises a wheeled vehicle having a frame, a pedestal mounted on and supported by said frame having an upright mast, a sleeve rotatable on said mast, a lower derrick boom pivoted on the upper end of said sleeve, an upper derrick boom telescoped in said lower boom, a driving tool removably mounted on the end of the upper boom beyond the end of the lower boom, means for rotating said sleeve to position the derrick boom circumferentially of the vehicle, means for extending and retracting the upper boom to space the driving tool relative to the vehicle, said driving tool having an adjacent upright post with a foot adapted to rest on the ground, means for controlling the attitude of said post relative to the upper derrick boom, a carriage slidable on the post, a hammer guide mounted on the carriage, a spring-loaded anvil depending from the hammer guide, a hammer slidable in said hammer guide adapted to impact against the anvil, a hydraulic lift mechanism for said hammer, tension springs stretched by said lift mechanism for propelling the hammer against the anvil, a dump valve for said mechanism having open and closed cycles, means controlling the rate of said cycles to control the stroke and impact rate of the hammer, and means for down-crowding the carriage to hold the anvil continuously against the work piece to be driven by the hammer.

4,124,082

METHOD OF AND APPARATUS FOR CUTTING A TUNNEL IN PLASTIC SOIL

Curtis M. Garver, 3701 Kirby - Suite 1236, Houston, Tex. 77006

Filed Jun. 10, 1977, Ser. No. 805,341
Int. Cl.[2] E02D *7/06;* **E21C** *19/00;* **F16L** *1/02*
U.S. Cl. 175—62 **10 Claims**



1. A method of cutting a tunnel in plastic soil using an apparatus comprising a pipe and cutting means mounted on one end of said pipe, said method comprising the steps of:
(a) driving said pipe into plastic soil, cutting means first;
(b) withdrawing said pipe from the plastic soil in the opposite direction to the direction in which it was inserted; and then
(c) suspending said pipe in the air with the cutting means uppermost to allow the soil within said pipe to slide out.

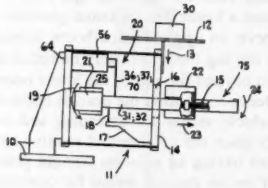
4. Apparatus for cutting a tunnel in plastic soil, said apparatus comprising:
(a) a pipe;
(b) cutting means mounted on one end of said pipe;
(c) means for driving said pipe into plastic soil, cutting means first;
(d) means for withdrawing said pipe from the plastic soil in the opposite direction to the direction in which it was inserted; and
(e) means coupled to said pipe adjacent to said cutting means for suspending said pipe in the air with the cutting means uppermost in order to allow the soild within said pipe to slide out.

4,124,083

AUTOMATIC ANALYTICAL WEIGHING SCALE

Paul R. Sette, Hamden, Conn., and Anthony Storace, Tarrytown, N.Y., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jun. 17, 1977, Ser. No. 807,395
Int. Cl.[2] G01G *7/00*
U.S. Cl. 177—214 **5 Claims**



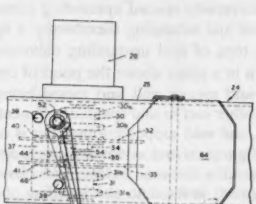
1. An automatic analytical weighing scale for measuring the weight of a load, comprising:
a base;
a load support structure carried by the base and movable in response to a load to be weighed being placed thereupon;
a rotatable lead screw operatively connected to said load support, and supporting a movable balance weight threaded thereon, said lead screw being pivotably supported upon said base and being pivotable in response to movement of either said load support structure or said balance weight, the movement of the load support structure pivoting the lead screw in an opposite sense than that induced by the movement of the balance weight;
a motor operatively connected to said lead screw for rotatively driving said lead screw to movably advance said balance weight upon said lead screw;
a balance detector supported upon a bendable connecting strip disposed between the base and said lead screw, said bendable connecting strip being caused to flex when said lead screw is caused to pivot, whereby said balance detector senses flexure in said bendable connecting strip, and therefore, can detect when said lead screw has achieved a balanced pivotable condition to cancel the pivoting induced by the load support structure upon said lead screw due to placement of a weight upon said load support structure; and
measuring means operatively connected to said lead screw for measuring the rotating of the lead screw, the measurement of said rotation being indicative of the weight of said load.

4,124,084

PARKING BRAKE FOR A SKID STEER LOADER VEHICLE

Larry E. Albright, Gwinner, and James J. Bauer, Lisbon, both of N. Dak., assignors to Clark Equipment Company, Buchanan, Mich.

Division of Ser. No. 654,257, Feb. 2, 1976, abandoned. This application Nov. 29, 1976, Ser. No. 745,905
Int. Cl.[2] B62D *11/04*
U.S. Cl. 180—6.48 **5 Claims**

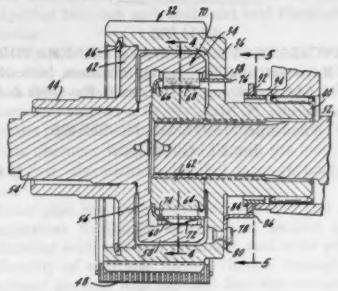


1. In a skid steer vehicle having first and second separate drive means operable to independently drive first and second sets of drive wheels mounted on opposite sides of the vehicle, including a pair of hydrostatic motors axially aligned for driving each set of wheels independently, each motor having an output shaft extending therefrom for engagement with its respective drive means, a brake mechanism comprising a pair of rotatable discs, each disc mounted on the respective output shaft of an associated hydrostatic motor for integral rotation therewith, a mounting bracket assembly mounted adjacent to the drive means of the vehicle and overlying the rotatable discs, engageable portions disposed in the mounting bracket assembly and movable independently thereof, and actuating means disposed adjacent to the engageable portions, whereby movement of the actuating means in a locking direction forces the engageable portions into contact with the rotatable discs of the brake mechanism, stopping the rotation of the discs and locking the drive means of the vehicle in fixed relation, said mounting bracket assembly having separable portions through which the discs freely rotate when the drive means is engaged and the portions engaging the discs comprise brake members capable of having a compressive force applied thereto, said brake members being carried on the mounting bracket and disposed on opposite sides of the rotatable discs and interposed therebetween for engagement therewith.

4,124,085
AUTOMATIC FOUR-WHEEL DRIVE TRANSFER CASE

Mark J. Fogelberg, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 21, 1976, Ser. No. 725,071
Int. Cl.[2] B60K *17/34*; F16D *41/10*
U.S. Cl. 180—49 15 Claims

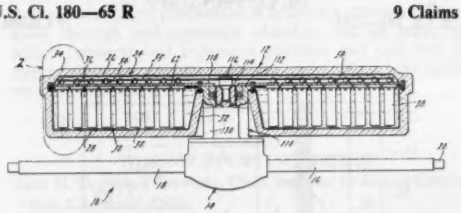


1. In a four-wheel drive vehicle having a transfer case for transferring rotary motion from a source of power to first and second pairs of traction wheels, said transfer case including a housing, an input shaft and first and second output shafts rotatably supported in said housing, and means in said housing for transferring rotary motion from said input shaft to said output shafts, said transferring means coupling said input shaft with said first output shaft and including an overrunning clutch coupled with said second output shaft, said clutch having first and second elements respectively rotatable with said first and second output shafts and defining first and second clutch races, and a plurality of rollers supported between said clutch races for relative movement between two clutch engaging positions; the improvement comprising means in frictional engagement with said second element for biasing said rollers toward one of said clutch engaging positions, and latch means responsive to rotation of said first element for blocking said relative movement of said rollers to said one clutch engaging position, said latch means being constructed and arranged to be capable of camming said rollers out of said one clutch engaging position in response to said rotation of said first element.

4,124,086
ELECTRIC VEHICLE DRIVE TRAIN HAVING UNIPOLAR MOTOR

Adam M. Janotik, Grosse Ile, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 10, 1978, Ser. No. 863,099
Int. Cl.[2] B60K *17/08*
U.S. Cl. 180—65 R 9 Claims



1. A drive train for an electric vehicle, said drive train comprising:

a DC source of electrical energy, said DC source including a container having an electrically conductive container portion and a liquid metal within said conductive container portion, said conductive container portion being one electrode, either cathode or anode, of said DC source, said DC source having an other electrode and producing a voltage between said one and said other of said electrodes;

a unipolar motor, said unipolar motor having a stator attached to said container, said stator having a conductive portion electrically coupled to said conductive container portion, said unipolar motor having a rotor including a shaft and a conductive rotor portion, said unipolar motor including means for electrically coupling said rotor portion to said stator portion and to said other of said electrodes, thereby, to permit current flow between said one and said other of said electrodes through said stator and rotor portions and through said coupling means;

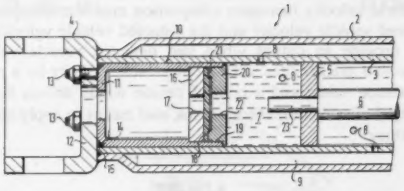
a differential for a vehicle, said differential being driven by said shaft of said unipolar motor, said differential being attached to said stator of said unipolar motor;

the current flow through said unipolar motor being controllable by said means for electrically coupling said rotor portion to said stator portion and to said other electrode of said DC source and said rotor shaft being driven at a speed and torque determined by said current flow.

4,124,087
ACTIVATING DEVICES FOR PASSENGER RESTRAINING SYSTEMS IN VEHICLES

Manfred Bortfeld, Eching, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 12, 1975, Ser. No. 640,304
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1975, 2503565
Int. Cl.[2] B60R *21/00*
U.S. Cl. 180—91 22 Claims



1. A device for activating a passenger restraining system in a vehicle comprising a dash-pot assembly arranged to be operatively mounted between the vehicle structure and a bumper on the vehicle, the dash-pot assembly including:

a cylindrical tube;

an end closure member rigidly attached to one end of said tube;

a pot-shaped housing disposed within the tube and releasably attached at its bottom end to said end closure member;

a closure across said tube at the open end of said housing and formed by a rigid disc having an aperture therein of a diameter smaller than that of said tube and a movable sealing element closing said aperture;

a piston movable in the tube to form with the closure a chamber for pressure fluid in the tube;

throttle means in communication with said chamber arranged to control exit of pressure fluid from the chamber and to damp movement of the piston relative to the tube whereby to dissipate energy; and

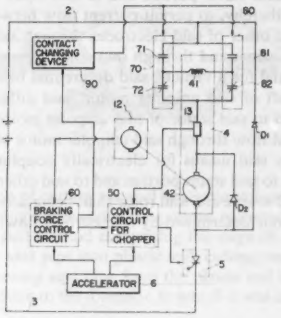
a sensor mounted in said housing, the sensor including an electrical switch operable in response to movements of said sealing element caused by fluid pressure variations in said chamber.

4,124,088

SAFETY DEVICE FOR A VEHICLE

Sigeru Kuriyama, and Minoru Kaminaga, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 12, 1976, Ser. No. 713,813
Claims priority, application Japan, Sep. 3, 1975, 50-105953
Int. Cl.[2] B60K *31/00*; B60T *8/08*
U.S. Cl. 180—105 E **2 Claims**



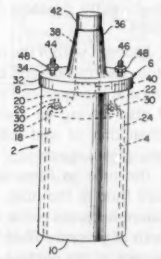
1. In an electromobile comprising a motor as a driving source, an accelerator for issuing a velocity instruction signal, means to control said motor in response to said instruction signal, means to detect a vehicle velocity, and means to apply electric braking by utilizing said motor, a safety device for said electromobile characterized by comprising: means to store a vehicle velocity, the storing means being so constructed as to store the vehicle velocity at the time when said accelerator issues an instruction of zero velocity, to renew and store the vehicle velocity each time under the state under which said vehicle velocity lowers, and to hold and store a vehicle velocity value before increase of said vehicle velocity when the vehicle velocity increases; comparison means to compare the stored vehicle velocity and the detected vehicle velocity and to provide an output when said detected vehicle velocity becomes greater than said stored vehicle velocity by a predetermined value; and a control device which drives, by said output of said comparison means, said means to apply electric braking.

4,124,089

PHANTOM COIL COVER FOR AUTOMOBILES

Hugo Caramagne, 1233 Main Ave., Clifton, N.J. 07011

Filed Aug. 12, 1977, Ser. No. 824,045
Int. Cl.[2] B60R *25/00*
U.S. Cl. 180—114 **8 Claims**



1. A phantom coil cover for theft prevention of automotive vehicles, comprising:

(a) a coil housing having at least one opening at the lower end thereof;

(b) ignition coils disposed within said housing, comprising a high voltage terminal and two low voltage terminals; and

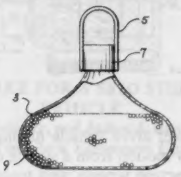
(c) a coil housing cover secured to the upper end of said coil housing, said housing cover comprising a high voltage terminal connector releasably attached to said high voltage terminal of said ignition coils and two phantom low voltage terminals not connected to said ignition coils.

4,124,090

BOUNCELESS SEISMIC WAVE GENERATOR

Charles B. Reynolds, and Thomas O. Summers, both of Albuquerque, N. Mex., assignors to Charles B. Reynolds & Associates, Albuquerque, N. Mex.

Filed Apr. 7, 1977, Ser. No. 785,498
Int. Cl.[2] G01V *1/04*
U.S. Cl. 181—121 **14 Claims**



1. A droppable non-rigid weight for impacting without bounce upon a ground surface to generate seismic waves during seismic investigations, said non-rigid weight comprising in combination:

a. a grouping of weights for developing the mass of said non-rigid weight;

b. a flexible envelope for enclosing said grouping of weights, said flexible envelope being conformable in shape to a redistribution of said grouping of weights upon impact of said non-rigid weight with the ground surface; and

c. means attached to said flexible envelope for releasably suspending said non-rigid weight above the ground surface;

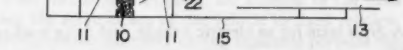
whereby, redistribution of said grouping of weights within said envelope eliminates bounce of said non-rigid weight upon impact with the ground surface.

4,124,091

SILENCER FOR AN INTERNAL COMBUSTION ENGINE

Shinichiro Mizusawa, Okazaki, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation-in-part of Ser. No. 693,854, Jun. 8, 1976, abandoned. This application Aug. 18, 1977, Ser. No. 825,689
Claims priority, application Japan, Dec. 24, 1975, 50-155644
Int. Cl.[2] F01N *1/08*
U.S. Cl. 181—231 **9 Claims**



1. A silencer which may be positioned in an exhaust system of an internal combustion engine, said silencer comprising:

walls forming the main body of said silencer;

a first separator supported by said walls, to thereby define a rear chamber therebetween;

a second separator supported by said walls, to thereby define a first intermediate chamber between said walls and said first and second separators;

a flame-extinguishing device having a space formed therein by a pair of porous plates and said walls of the main body and being filled with a non-catalytic material to thereby define a second intermediate chamber between said walls and said second separator as well as to define a front chamber between said walls and said flame-extinguishing device;

an inlet pipe in fluid communication with said front chamber whereby an exhaust gas may flow from said inlet pipe into said front chamber and over the entire surface of said flame extinguishing device;

an outlet pipe in fluid communication with said first intermediate chamber whereby the exhaust gas may flow out of said first intermediate chamber through said outlet pipe; and

an inner pipe positioned between said first and said second separators to fluidly couple said second intermediate chamber with said rear chamber, said inner pipe having a plurality of apertures formed therein through which the exhaust gas may lead into said first intermediate chamber, said inlet and outlet pipes and said inner pipe being positioned such that they do not extend through said flame extinguishing device whereby the active surface area and therefor the capacity of said flame extinguishing device are increased.

4,124,092

MUFFLER FOR AUTOMOBILES

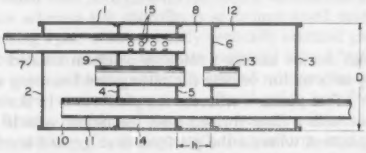
Sadao Kajiya; Tomiaki Atsumi; Osamu Kuroda, and Tamio Nakakubo, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 24, 1977, Ser. No. 800,015

Claims priority, application Japan, Feb. 21, 1977, 52/17884

Int. Cl.[2] F01N *1/00*

U.S. Cl. 181—265 **7 Claims**



1. A muffler for automobiles comprising a tubular body having equivalent diameter D, two end plates and at least two baffle plates each traversing the internal space of said tubular body so as to define an expansion chamber having axial length *h* and a low frequency resonator chamber therebetween, gas inlet and outlet pipes connected to said expansion chamber at transversely spaced positions so as to cause a transverse flow of gases through said expansion chamber, and an insert pipe which connects said expansion chamber and said low frequency resonator chamber, wherein ratio *h*/D is substantially between 0.25 and 0.4.

4,124,093

WORK-SUPPORTING DEVICE

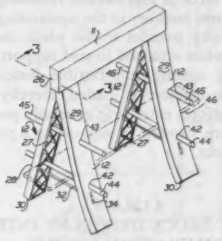
John H. Breisch, Lakewood, Ohio, assignor to Jonvin Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 591,429, Jun. 30, 1975, Pat. No. 4,014,405. This application Mar. 4, 1977, Ser. No. 774,337

Int. Cl.[2] F16M *11/00*

U.S. Cl. 182—181 **37 Claims**

1. A supporting device comprising a hollow, integrally molded cross beam having horizontal end portions open at the under side thereof, at least the end portions of said beam having vertical side walls and vertical members extending transversely between said side walls, said vertical members and said side walls defining vertical recesses open at the under side thereof, there being at least one such recess in each end portion of the beam, and at least two pairs of separately formed integrally molded legs, each leg having an upper portion and a lower portion extending at an obtuse angle from said upper portion, the dimensions of the upper portions of said legs being such that when the upper portions of two legs are juxtaposed and in contact with the lower portions thereof diverging from



each other, the said juxtaposed upper end portions will fit closely within one of said vertical recesses with the outer surfaces of said juxtaposed legs in frictional engagement with inner surfaces of the recesses in said beam, an outer surface of the upper portion of each of said legs and an adjacent inner surface of each recess having interfitting parts for removably securing said legs in said recesses against accidental displacement therefrom without requiring any separate fastening devices.

4,124,094

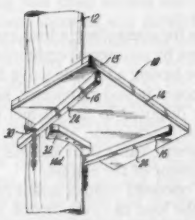
PORTABLE PLATFORM DEVICE

Donald P. Cande, 16 The Spur, Locust Valley, N.Y. 11560

Filed Sep. 20, 1976, Ser. No. 724,629

Int. Cl.[2] A47C *9/10*

U.S. Cl. 182—187 **13 Claims**



1. A portable platform device for mounting to trees, poles and other upstanding support structures, comprising:

a generally flat platform member having a back edge adapted to abut the upstanding support structure;

a pair of support struts attached, each along an edge portion, to the bottom surface of said platform member and extending beyond the back edge of said platform member; and

adjustable mounting means for fastening said platform member to the upstanding support, said adjustable mounting means comprising:

a first generally flexible fastening member adapted to be attached to a first of said support struts, to a portion of said first support strut other than the edge thereof attached to the bottom surface of said platform member,

a second generally flexible fastening member adapted to be attached to the second of said support struts, to a portion of said second support strut other than the edge thereof attached to the bottom surface of said platform member, and

tension clamp means adapted to be coupled between, and to connect, said first and second flexible fastening members for permitting adjustable coupling of said first and second flexible fastening members around the upstanding support and between said support struts,

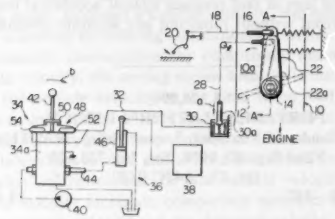
such that when the back edge of said platform member is located in abutting relation to the support structure with said mounting means wrapped therearound and said flexible fastening members extending over the top edges of said support struts, said tension clamp means can be adjusted to provide a substantial tension force in said flexible fastening members for securing said platform member to the upstanding support, said force acting generally parallel to the plane defined by said platform member when attached to said support structure and said struts bearing against said flexible fastening members when said platform member is loaded, thereby to provide a generally stable platform extending generally perpendicular to the support structure, capable of supporting a person in seated and standing postures.

4,124,095

FORK LIFT TRUCK DRIVEN BY INTERNAL COMBUSTION ENGINE

Toshikazu Ezure, Musashi-murayama, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Mar. 3, 1977, Ser. No. 773,951
Claims priority, application Japan, Mar. 4, 1976, 51-22678
Int. Cl.[2] B66F *9/22*
U.S. Cl. 187—9 R **4 Claims**



1. A system for controlling a load carrying device of a fork lift truck driven by an internal combustion engine, comprising:

a carburetor having a throttle valve fixed to a throttle valve shaft disposed in said carburetor, said throttle valve being rotatably disposed in the air-fuel mixture induction passage of said carburetor, and a first lever fixedly mounted on the throttle valve shaft and mechanically connected to an accelerator of the engine;

a manually operated control means for controlling the operation of the load carrying device, said manually operated control means including switching means for supplying therethrough electric current when a manually operable member of said manually operated control means is operated to operate the load carrying device; and

means for partially opening said throttle valve by a predetermined amount from the fully closed position of said throttle valve in response to the movement of said manually operated control means, whereby the engine output power and engine speed are increased to increase the speed of the operation of the load carrying device, the throttle valve opening means including

a second lever rotatably connected to the throttle valve shaft and having a stop which is engageable with said first lever,

a diaphragm actuator including a casing, a diaphragm which divides the inside of the casing into an atmospheric chamber communicated with atmospheric air and a vacuum chamber communicated with a vacuum source through a vacuum passageway connecting the vacuum chamber to the vacuum source, a connecting rod connecting said diaphragm and said second lever, and a spring disposed in said casing to normally urge said connecting rod in the direction that the stop of said second lever is engaged to cause said first lever to rotate in the direction for opening the throttle valve by the predetermined amount, and

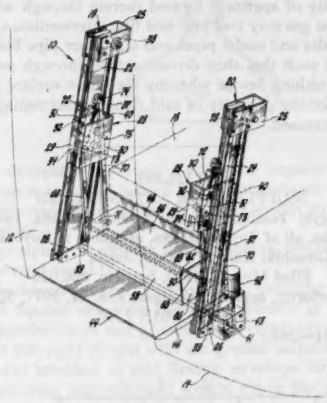
a solenoid valve arranged to open the vacuum passageway to establish communication between the vacuum chamber and the vacuum source, or close the vacuum passageway to block the communication therebetween in response to the electric current supplied through said switching means.

4,124,096

WHEELCHAIR LIFT DEVICE

Peter P. Dudynskyj, Metamora; Daniel L. Kline, Utica, and James T. Hogan, Oxford, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 4, 1977, Ser. No. 839,320
Int. Cl.[2] B60P *1/44;* B60R *3/02*
U.S. Cl. 187—9 R **3 Claims**



1. A lift device having a foldable platform located in the doorway of a motor vehicle for raising and lowering a load between a first position wherein the platform is in horizontal alignment with a floor formed with the motor vehicle and a second position wherein the platform is at ground level, said device comprising a pair of substantially vertically oriented guide bars secured to said vehicle at the opposite sides of said doorway, a carriage having vertically spaced roller means mounted thereon for rotation along each of said guide bars for controlling movement of said platform between said first and second positions, said platform comprising a pair of base sections, a tread section and a riser section adapted to be moved from a step forming position wherein adjacent sections are angularly disposed relative to each other to a load support position wherein said adjacent sections are located in a horizontal plane, a first pivot connection joining said pair of base sections for pivotal movement about a horizontal axis, a second pivot connection joining said tread section and said riser section for pivotal movement about an axis parallel to said horizontal axis, third and fourth pivot connections joining said riser section and said tread sections to said base sections whereby said riser and tread sections are movable by said base sections between said step forming position and said load support position, a linkage comprising a pair of parallel links connecting the carriage with said base sections for supporting the platform, a power-operated linearly extensible and contractible member combined with said linkage and operatively connected to said carriage at one end and to one of said links at the other end for causing said linkage to swing outwardly relative to the doorway whereby the sections move into the load support position, and motor means including a chain drive operatively con-

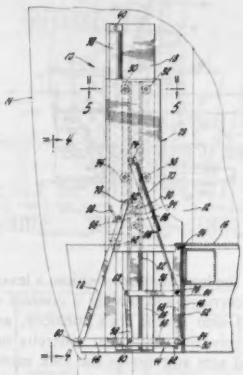
nected to the carriage for moving the platform between said first and second positions when the base sections are in said load support position.

4,124,097

WHEELCHAIR LIFT DEVICE

Dale A. Hawks, Clarkston; Daniel L. Kline, Utica, and James T. Hogan, Oxford, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 4, 1977, Ser. No. 839,321
Int. Cl.[2] B60P *1/44;* B60R *3/02*
U.S. Cl. 187—9 R 3 Claims



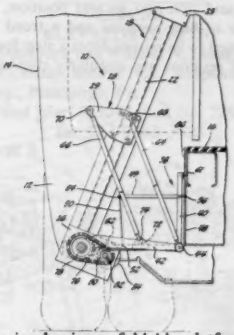
1. A lift device having a platform located in the doorway of a motor vehicle for raising and lowering a load between a first position wherein the platform is in horizontal alignment with an elevated floor formed with the motor vehicle and a second position wherein the platform is at ground level, said device comprising a pair of substantially vertically oriented guide bars secured to said vehicle along the opposite sides of said doorway, a carriage having vertically spaced roller means mounted thereon for rotation along each of said guide bars for movement from a raised position to a lowered position, a pair of links connecting the carriage with the platform, said platform including first and second base sections and a tread section and a riser section all pivotally interconnected to each other and adapted to form a stairway that is convertible to a horizontal support for said load, said first base section being located in a vertical plane and said second base section being located in a horizontal plane when said base sections are in a stairway forming position, one of said links being a power-operated linearly extensible member having one end thereof pivotally connected to said carriage at a first pivot point and the other end pivotally connected to said first base section at a second pivot point, the other of said links being a rigid member having one end thereof pivotally connected to the carriage at a third pivot point and the other end thereof pivotally connected to said second base section at a fourth pivot point, the arrangement of said links being such that a straight line connecting said third and fourth pivot points when extended passes between said first and second pivot points when said base sections are in the stairway forming position and in the horizontal support position and the arrangement of the sections being such that contraction of said power-operated linearly extensible member causes the pair of links to swing outwardly relative to the doorway with the base sections and the tread and riser sections of the platform moving into positions to form said horizontal support, and motor means operatively connected to the carriage for moving the platform with the sections horizontally aligned between said first position and said second position.

4,124,098

WHEELCHAIR LIFT DEVICE

Peter P. Dudynskyj, Metamora, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 4, 1977, Ser. No. 839,322
Int. Cl.[2] B60P *1/44;* B60R *3/02*
U.S. Cl. 187—9 R 3 Claims



1. A lift device having a foldable platform located in the doorway of a motor vehicle for raising and lowering a load between a first position wherein the platform is in horizontal alignment with a floor formed with the motor vehicle and a second position wherein the platform is at ground level, said device comprising a pair of substantially vertically oriented guide bars secured to said vehicle at the opposite sides of said doorway, a carriage mounted on each of said guide bars for controlling movement of said platform between said first and second positions, said platform comprising a pair of base sections and a tread section and a riser section adapted to be moved from a step forming position wherein adjacent sections are angularly disposed relative to each other to a load support position wherein said adjacent sections are located in a horizontal plane, a first pivot connection joining said pair of base sections for pivotal movement about a horizontal axis, a second pivot connection joining said tread section and said riser section for pivotal movement about an axis parallel to said horizontal axis, third and fourth pivot connections joining said riser section and said tread sections to said base sections whereby said riser and tread sections are movable by said base sections between said step forming position and said load support position, a spring located at said first pivot connection for normally urging said base sections towards the load support position, a linkage connecting the carriage with said base sections for supporting the platform, an arm having one end rotatably mounted to said vehicle and the other end pivotally connected to one of said base sections for moving said platform in an arc between said first and second positions and said step forming position, and means operatively connected to said arm for rotating said arm and thereby moving the platform between said first and second positions when the base sections are in said load support position and into said step forming position.

4,124,099

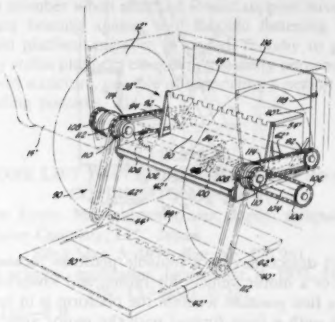
WHEELCHAIR LIFT DEVICE

Peter P. Dudynskyj, Metamora, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 4, 1977, Ser. No. 839,428
Int. Cl.[2] B60P *1/44;* B60R *3/02*
U.S. Cl. 187—9 R 3 Claims

1. A lift device having a foldable platform located in the doorway of a motor vehicle for raising and lowering a load between a first position wherein the platform is in horizontal alignment with a floor formed with the motor vehicle and a second position wherein the platform is at ground level, said device comprising a pair of arms mounted to said vehicle at the

opposite sides of said doorway, means connecting one end of each of said arms to said vehicle for rotation about a first horizontal axis, pivot means connecting the other end of each of said arms to said platform, a first sprocket wheel fixed with said vehicle adjacent said one end of each of said arms and a second sprocket wheel fixed with said platform adjacent said pivot means; a chain entrained about said first and second sprocket wheels for controlling movement of said platform and for maintaining said platform in a horizontal attitude as it is moved between said first and second position, said platform comprising a pair of base sections and a tread section and a riser section adapted to be moved from a step forming position wherein adjacent sections are angularly disposed relative to



each other to a load support position wherein said adjacent sections are located in a horizontal plane, a first pivot connection joining said pair of base sections for pivotal movement about a horizontal axis, a second pivot connection joining said tread section and said riser section for pivotal movement about an axis parallel to said horizontal axis, third and fourth pivot connections joining said riser section and said tread sections to said base sections whereby said riser and tread sections are movable by said base sections between said step forming position and said load support position, and motor means operatively connected to said one end of each of said arms for rotating the latter in an arc whereby the platform is moved from said step forming position to said first and second positions.

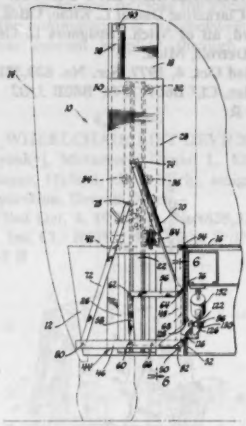
4,124,100

LOCKING ARRANGEMENT FOR WHEELCHAIR LIFT DEVICE

Dale A. Hawks, Clarkston, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 13, 1978, Ser. No. 877,239
Int. Cl.[2] B60P 1/44; B60R 3/02
U.S. Cl. 187—9 R **3 Claims**

1. In a lift device having a foldable platform located in the doorway of a motor vehicle for raising and lowering a load between a first position wherein the platform is in horizontal alignment with an elevated floor formed with the motor vehicle and a second position wherein the platform is at ground level, said device comprising a pair of substantially vertically oriented guide bars secured to said vehicle at the opposite sides of said doorway, a carriage mounted on each of said guide bars for moving said platform between said first and second positions, said platform comprising a pair of planar base sections and a tread section and a riser section adapted to be moved from a step forming position to a load support position, a latch for locking one of the base sections to the carriage when the sections are in said load support position, said latch including a bracket secured to said carriage, a lock member pivotally mounted on said bracket and having an arm at one end and a hook portion at the other end adapted to move into an opening formed in said one of the base sections when the latter is located in the load support position, a spring continuously biasing said lock member into a locked position wherein said hook portion is located in the path of movement of said one of the base sections, said hook portion having a curved outer surface which allows said one of the base sections to engage said curved surface to move the lock member against the bias of said spring to an unlocked position prior to said hook portion moving into said opening as the sections move from the step



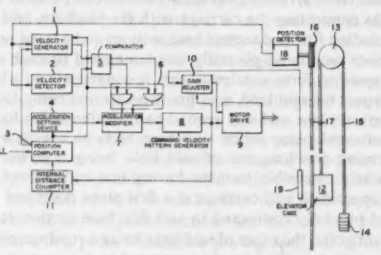
forming position to the load support position, a lever pivotally supported by said carriage and having a contact surface located adjacent said arm of the lock member, and power-operated means for pivoting said lever whereby said contact surface engages said arm and moves the lock member to the unlocked position to release said one of the base sections.

4,124,101

ELEVATOR SPEED CONTROL APPARATUS

Tsuyoshi Satoh, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1976, Ser. No. 736,818
Claims priority, application Japan, Oct. 29, 1975, 50-130257
Int. Cl.[2] B66B 1/30
U.S. Cl. 187—29 R **4 Claims**



1. An elevator speed control apparatus comprising: an ideal velocity generator for generating a velocity ideal for the cage to travel the distance to a floor the cage is to land; a velocity detector for detecting the velocity of the cage in motion; a comparator for comparing the actual cage velocity data supplied from the velocity detector with the ideal velocity data supplied from the ideal velocity generator; an acceleration setting device for setting an acceleration for the cage; an acceleration modifying device operated by the output of the comparator, for modifying the acceleration data supplied from the acceleration setting device; a command velocity pattern generator for integrating with time the acceleration data supplied from the acceleration modifying device and thus generating a

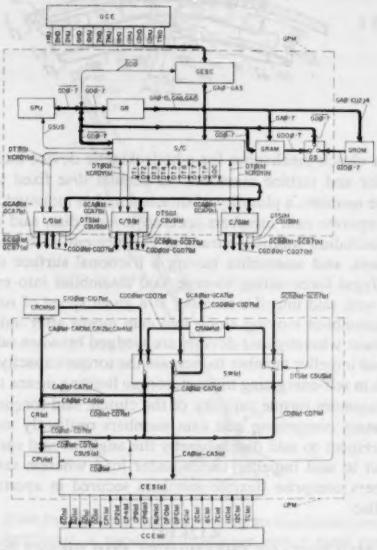
command velocity pattern; and a motor driving device for controlling the cage hoist driving motor according to the command velocity pattern; wherein an ideal cage velocity is maintained by modifying the acceleration data according to the output of the comparator.

4,124,102

ELEVATOR CONTROL SYSTEM

John Charles Doane, Somerset, N.J., and Joseph Bittar, Brooklyn, N.Y., assignors to Otis Elevator Company, New York, N.Y.

Filed Jan. 21, 1977, Ser. No. 761,503
Int. Cl.[2] B66B *1/18*
U.S. Cl. 187—29 R **12 Claims**



1. A control systemm for use in an elevator installation having a plurality of cars serving a plurality of floors, said installation having group control equipment common to said plurality of cars including hall call registration means producing hall call signals and car control equipment individual to each of said cars for controlling its associated car, each said car control equipment including car operation apparatus, car call registering means and car position signifying means, the latter two producing car call and car position signals, respectively, said control system connected to both said car control equipment and said group control equipment for receiving therefrom car call and car position signals and hall call signals, said control system comprising:

program storage means storing control programs of instructions therein including a car program of instructions for each car and a group program of instructions;

car processing means connected to said program storage means, said car processing means sequentially performing a first set of operations by following in a step-by-step manner each car program of instructions to produce first car control signals in response to said associated car call and car position signals and to apply said first car control signals to the associated car operating apparatus to cause it to operate its associated car in a particular manner; and

group processing means connected to said program storage means and to said car processing means, said group processing means sequentially performing a second set of operations by following in a step-by-step manner said group program of instructions to produce group control signals in response to selected first car control signals and hall call signals and to apply said group control signals to said car processing means;

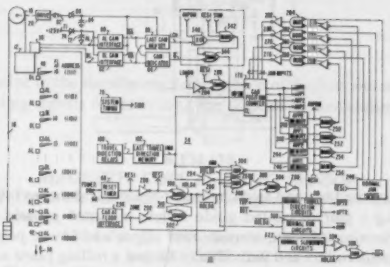
said car processing means operating to produce second car control signals in response to said group control signals and to apply said second car control signals to said individual car operating apparatus to cause said car operating apparatus to operate said associated cars in response to said hall call signals as a supervised group.

4,124,103

ELEVATOR SYSTEM

Paul R. Otto, Marlboro, and William N. Leang, Randolph Township, Morris County, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 9, 1977, Ser. No. 775,808
Int. Cl.[2] B66B *3/02*
U.S. Cl. 187—29 R **7 Claims**



1. An elevator system, comprising:

a building having a plurality of floors,

an elevator car mounted for movement in said building to serve the floors therein,

car position means providing a signal indicative of the position of said elevator car in the building,

detector means responsive to movement of said elevator car for updating said car position means,

first memory means responsive to said detector means for retaining the latest indication of movement of said elevator car,

an electrical power supply for said car position means, said detector means and said first memory means,

capacitor means charged by said electrical power supply means, said capacitor means being connected to operate said detector means and said first memory means for a predetermined period of time following interruption of said electrical power supply, said predetermined period of time being at least as long as it takes for the elevator car, when moving, to come to a stop following an interruption of said electrical power supply,

and comparison means responsive to said car position means and to said first memory means, said comparison means providing an out-of-step signal following the return of the electrical power supply after interruption thereof when the first memory means indicates predetermined movement of the elevator car occurred following such interruption.

4,124,104

LIFT MASK CARRIAGE MOUNTING ARRANGEMENT

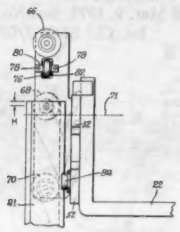
William T. Yarris, Brookpark, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Continuation of Ser. No. 676,833, Apr. 14, 1976, abandoned. This application May 18, 1977, Ser. No. 798,057
Int. Cl.[2] B66B *9/20*
U.S. Cl. 187—95 **3 Claims**

1. In a lift mast carriage mounting arrangement of the type including a support assembly having an upright pair of laterally spaced and inwardly facing channular beams, each beam having a pair of rail surfaces and an interconnecting web surface, the rail surfaces being substantially normal to the respec-

tive web surface; a carriage assembly having an upright pair of elongated legs, an upper pair of guide rollers, a lower pair of guide rollers, an upper pair of side thrust rollers, and a lower pair of side thrust rollers, the legs being disposed for movement between and longitudinally along the channular beams on the rollers, the upper and lower pairs of guide rollers individually having rolling planes longitudinally oriented and substantially normal to the rail surfaces; wherein the improvement comprises:

means for coupling with said lower pair of side thrust rollers for transmitting side thrust forces from the carriage assembly to said channular beams only when said upper guide rollers and said upper side thrust rolllers are elevationally



disposed beyond said channular beams, said means including a pair of canted guide rollers mounted on said legs elevationally intermediate said upper and lower pairs of guide rollers and individually having a rolling plane angularly oriented relative to said rail surfaces and said web surfaces, said canted guide rollers being substantially free of force transmitting contact with said channular beams when said upper guide rollers are elevationally disposed within said channular beams

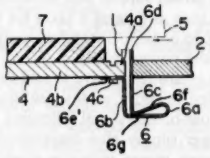
said rolling planes of said canted guide rollers being angularly inclined at least about three degrees relative to said rolling planes of said upper and lower pairs of guide rollers.

4,124,105

AUDIBLE ALARM SOUNDING TYPE PAD CLIP DEVICE FOR DISC BRAKE

Toshifumi Maehara, Gyoda, Japan, assignor to Akebono Brake Industry Company, Ltd., Tokyo, Japan

Filed Jun. 27, 1977, Ser. No. 810,419
Int. Cl.[2] F16D *66/02*
U.S. Cl. 188—1 A **4 Claims**

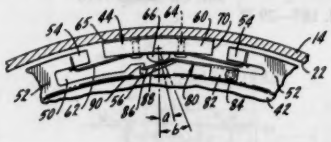


1. In a disc brake system having a brake disc, a support structure and at least one brake pad assembly mounted for reciprocal movement on said support structure; a dual function resilient pad clip, said pad clip having two side portions; a first side portion attached to said brake pad assembly and a projecting side portion engaging said support structure, such that said pad clip prevents rattling of said brake pad; said projecting side portion having an end extending to a point coinciding with an allowable limit of wear of said brake pad assembly such that when said brake pads reach said allowable limit of wear said end contacts said brake disc thereby giving an audible indication of brake wear, the improvement comprising resisting means for substantially preventing relative movement between said side portions in a direction away from the plane of the disc and thereby resisting movement of said projecting side portion in a direction away from the plane of said brake disc.

4,124,106

WEDGING CENTRIFUGAL LOCK UP CLUTCH WITH TORQUE LIMITER

Julius A. Clauss, Birmingham, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

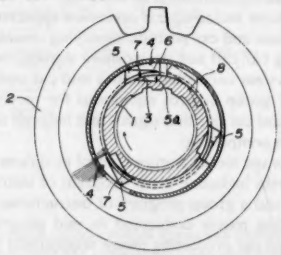
Filed Dec. 28, 1976, Ser. No. 754,934
Int. Cl.[2] F16D *43/14*
U.S. Cl. 192—3.31 **3 Claims**

1. A clutch mechanism for a hydrokinetic device including impeller and turbine members, an annular disc fixed to said turbine member, a plurality of shoe assemblies mounted in said disc, separate cam members secured to said disc, said assemblies including follower means in engagement with said cam members, said assemblies having a frictional surface theron, centrifugal force acting to urge said assemblies into engagement with said impeller member at a given speed of rotation, said assemblies moving along said cam means after initial engagement whereby said devices are wedged between said disc and said impeller member to increase the torque capacity of the clutch in self-energizing manner, torque limiting means to limit the maximum torque capacity of the clutch, said torque limiting means comprising said cam members resiliently movable with respect to said disc whereby the angle of said cam with respect to said impeller varies under load wherein said cam members comprise flexible members secured in apertures in said disc.

4,124,107

MULTISTAGE FREEWHEEL FOR BICYCLES

Masayoshi Kine, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Nov. 8, 1976, Ser. No. 740,038
Claims priority, application Japan, Nov. 18, 1975, 50-139491
Int. Cl.[2] F16D *23/00*; F16H *9/00*
U.S. Cl. 192—64 **11 Claims**



1. A multistage freewheel for a bicycle, comprising;

(a) at least two sprockets,

each of said sprockets having at the outer periphery thereof a plurality of teeth and at the center a round bore, said teeth varying in number on each of said sprockets.

(b) a cylindrical support individually rotatably supporting each of said sprockets thereon;

(c) at least two unidirectional rotary transmissions provided between the inner periphery of said round bore of each of said sprockets and the outer periphery of said support;

said transmissions allowing each of said sprockets to be in free rotation independent from each other; and

(d) means for applying rotary resistance to each of said sprockets in the free rotation thereof.

4,124,108

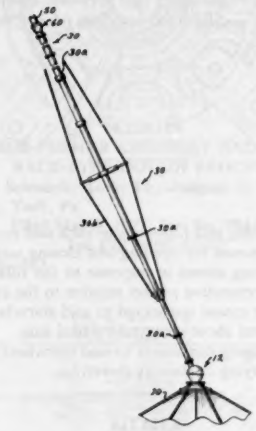
GRAIN DISPENSING ARRANGEMENT

Paul E. Phillips, and John E. Vinson, both of R.R. 1, Hazleton, Ind. 47640

Continuation of Ser. No. 517,926, Oct. 25, 1974, abandoned. This application Jul. 1, 1976, Ser. No. 701,534

Int. Cl.[2] B65G *11/12*

U.S. Cl. 193—16 **5 Claims**



1. A grain transporting and dispensing arrangement comprising a distributor, a receiving container and a flow conduit interconnecting said distributor and said receiving container, said receiving container mounting a rotatable dome defined by a first portion movable on a second portion, a receiving conduit projecting from said first portion having an upper end opening to the outside of said dome communicating with said flow conduit and a closed lower end within said dome, and said second portion communicating with said receiving container, said receiving conduit having an opening in a side thereof within said dome and spaced apart from said closed lower end to define a grain cushioning space between said opening and said closed lower end.

4,124,109

DISPENSING APPARATUS AND METHOD

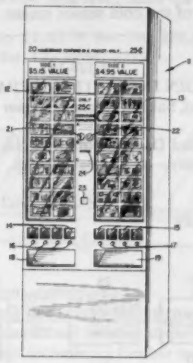
Robin Bissell, Lederach, Pa. 19450, and John T. Whitefield, Harleysville, Pa., assignors to Robin Bissell, Lederach, Pa.

Filed Feb. 11, 1977, Ser. No. 767,968

Int. Cl.[2] G07F *7/08, 11/00*

U.S. Cl. 194—4 R **19 Claims**

1. Apparatus for activating an article dispensing mechanism in response to a coin or coins being deposited in a coin receptacle and indicia on a check deposited in a check receptacle comprising means responsive to a correct coin value being deposited in the coin receptacle for deriving a first enabling signal, means for reading the indicia on the check in the check receptacle means for deriving a second enabling signal in response to a correct value for the read indicia, and means re-



sponsive to the simultaneous occurrence of the first and second enabling signals for activating the dispensing mechanism.

4,124,110

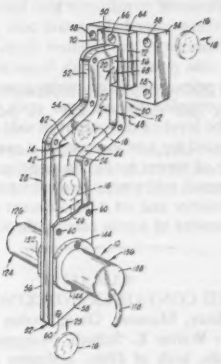
MAGNETIC COIN ELEMENT SENSOR

Jiri J. Hovorka, Muskogee, Okla., assignor to Orin W. Coburn, Muskogee, Okla.

Filed Jul. 23, 1976, Ser. No. 708,120

Int. Cl.[2] G07F *3/02*

U.S. Cl. 194—100 A **17 Claims**



1. Apparatus for producing output indications indicative of coin elements and the like, comprising:

coin sensor means comprising:

a permanent magnet having a pair of oppositely-polarized magnetic poles;

a pole extension magnet spaced a predetermined distance from one pole of the permanent magnet, the spacing between the pole extension magnet and the permanent magnet forming a portion for receiving the coin elements and the like, the permanent magnet magnetically polarizing the pole extension magnet to substantially the same magnetic polarity as said one pole of the permanent magnet to establish a magnetic field between the permanent magnet and the pole extension magnet, the magnetic field being changed via an interposed coin element and the like; and

a sensor coil having a predetermined number of ampere-turns disposed about a portion of the pole extension magnet, the magnetic field change caused via the interposed coin element and the like inducing an electromotive force in the sensor coil thereby providing an output

signal uniquely indicative of the interposed coin element and the like; and

means guiding the coin elements and the like into the magnetic field of the coin sensor means.

4,124,111

COIN INSPECTING APPARATUS

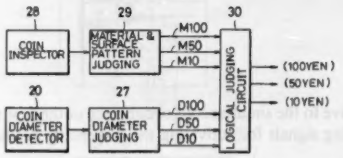
Yukichi Hayashi, Sakado, Japan, assignor to Nippon Coinco Co. Ltd., Japan

Filed Dec. 2, 1976, Ser. No. 746,803

Claims priority, application Japan, Dec. 2, 1975, 50-163254[U]

Int. Cl.[2] G07F *3/02*

U.S. Cl. 194—102 **8 Claims**



1. A coin receiving apparatus comprising a coin passage defining member for receiving coins of different diameters, and coin inspection means for classifying coins passing along said coin passage according to diameter, said coin inspecting means including two adjacent detecting coils positioned along said coin passage, at least one of said detecting coils being a secondary coil of a differential transformer also having a primary coil, said two coils being spaced along said coin passage a distance less than the diameter of the smallest diameter coin to be received in said coin passage, a high frequency oscillator connected to said primary coil for exciting said primary coil, a level detector coupled to said two coils for producing an output when the level of the output of said two coils simultaneously influenced by a coin exceeds a predetermined level, and a plurality of timers including one for each diameter of coin to be detected, said timers being connected to the output of said level detector and set with different response times for judging the diameter of a coin passing through said two coils.

4,124,112

ODD-SHAPED CONTAINER INDEXING STARWHEEL

Harold F. Mohney, Maumee, Ohio; Darius O. Riggs, Ottawa Lake, Mich.; Walter K. Schoch, Maumee, and Thomas B. Sorbie, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed May 23, 1977, Ser. No. 799,897

Int. Cl.[2] B65G *47/86*

U.S. Cl. 198—344 **5 Claims**

1. A non-round container handling starwheel for sequentially indexing upright containers to and through a series of circumferentially spaced positions where the containers are examined for defects either while being rotated about their vertical axes of held stationary, comprising:

a generally circular base plate;

a starwheel mounted above said base;

a plurality of container body size pockets at spaced peripheral points of the circumference of said starwheel;

said pockets having a generally hemispherical configuration of a diameter slightly larger than the largest horizontal dimension of the non-round container being handled;

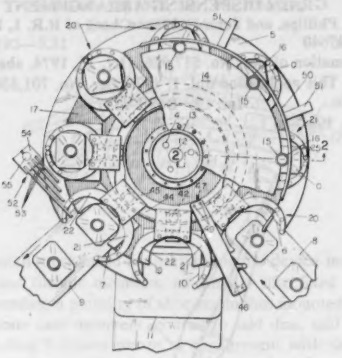
open and closeable container restraining and encircling means at each body pocket for receiving containers and closing thereabout to loosely encircle and restrain containers;

said restraining means comprising a pair of curved, semi-circular arms, each semi-circular arm being formed of a pair of vertically spaced, identical, parallel members, joined together at their extending ends;

means pivotally mounting said members of each arm to the body pockets with the members being respectively mounted above and below the pockets;

fixed cam means mounted to said base and positioned above said starwheel;

a cam follower, in engagement with said cam, at each pocket location and indexed with said starwheel;



means connecting said followers to each said encircling and restraining means for opening and closing said encircling and restraining means in response to the rotational position of the respective pocket relative to the cam;

indexing drive means connected to said starwheel to move said starwheel about a central vertical axis;

means for bringing containers to said starwheel; and

means for carrying containers therefrom.

4,124,113

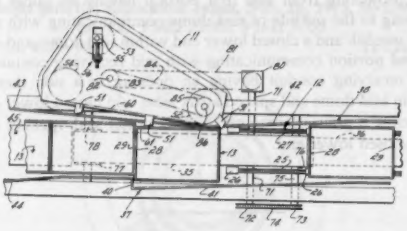
CASE INDEXER

Carl I. Trees, Moscow, Ohio, assignor to The Lodge & Shipley Company, Cincinnati, Ohio

Filed Jun. 9, 1977, Ser. No. 804,987

Int. Cl.[2] B65G *47/52*

U.S. Cl. 198—476 **4 Claims**



1. Apparatus for indexing cases onto an endless case conveyor having spaced lugs defining the location on the case on the conveyor,

means continuously urging a line of incoming cases toward said case conveyor in end-to-end abutting relation,

an endless indexing chain lying in a horizontal plane adjacent the upstream end of said conveyor,

spaced lugs projecting laterally outwardly from said chain and into the path of said incoming cases,

said lugs being spaced from each other a distance less than the length of a case,

each lug engaging the trailing side portion of a case to push said trailing portion laterally and thereby positioning said lug ahead of the front wall of the next succeeding case,

said indexing chain having a reach extending generally parallel to said line of cases but being angulated slightly toward said line of cases from its upstream end to its downstream end, whereby said indexing lugs gradually swing the rear end portion of each case laterally with respect to said line of cases,

at least one guide rail spaced from said indexing chain a distance sufficient to permit a case to pass between said chain and said rail,

said rail having an outwardly-extending indentation therein to permit the trailing end portion of a case to be swung into said indentation when it is engaged by a lug on said indexing chain, said rail having an angulated section downstream from said indentation to guide each case back to an in-line orientation,

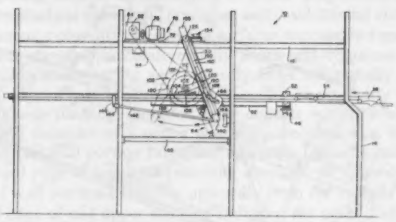
the movement of said chain lugs being timed to the movement of said conveyor lugs to release a case into the space between lugs on said case conveyor.

4,124,114

DISCHARGE PUSHER ASSEMBLY AND DRIVE OF A RACK-TYPE DOUGH PROOFER

Charles M. Schmuck, York, Pa., assignor to Teledyne Industries, Inc., York, Pa.

Filed May 5, 1977, Ser. No. 794,017
Int. Cl.² B65G *47/82*
U.S. Cl. 198—482 **10 Claims**



1. In a rack-type dough proofer of the type having a discharge pusher assembly which undergoes sinusoidal cyclic movement and which comprises a motor mounted on a proofer frame element, a crank arm rotatably mounted on a proofer frame element and connected to the motor to be rotatably driven thereby, an elongate operating arm having a straight cam slot defined therein and pivotally connected at one end thereof to a proofer frame element and connected to the crank arm via the cam slot to be pivoted thereby, a tierod connected to the operating arm to move therewith, and a pusher bar assembly slidably mounted on the proofer frame element and connected to the tierod to undergo a reciprocating movement between a rest position and a fully extended position, an improvement comprising:

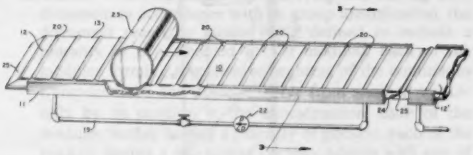
connecting means connecting the crank arm to the operating arm, said connecting means including attenuating means for attenuating movement of the pusher bar assembly so that the pusher bar assembly maintains a constant speed for a predetermined distance during the reciprocating movement thereof, said attenuating means including an arcuate slot section added to the cam slot, said predetermind distance including a location of initial contact between said pusher bar assembly and a pan containing proofed dough so that pusher bar assembly stroke speed can be maintained within prescribed limits at initial bar assembly-pan impact for a variety of pan lengths while overall cycle times and pusher bar assembly speeds of the pusher bar assembly remain within prescribed limits.

4,124,115

CONVEYER SYSTEM

Norman W. Moss, 215 S. 11th Ave., Suite D, Yakima, Wash. 98902

Filed May 11, 1973, Ser. No. 359,298
Int. Cl.² B65G *49/00*
U.S. Cl. 198—630 **2 Claims**



1. A conveyer system, comprising:

means for supporting said conveyer system;

a bladder-like pneumatic cell suitably disposed on said supporting means, and including a flexible resilient top wall, bottom wall, and a pair of opposing sidewalls;

a conveyer surface layer disposed on the uppermost terminal side of said top wall fabricated in resiliently compress with said pneumatic cell, one of the terminal ends of said cell having a chamfer on its lowermost side, and wherein the end opposite of said cell has a chamfer on its uppermost side; and

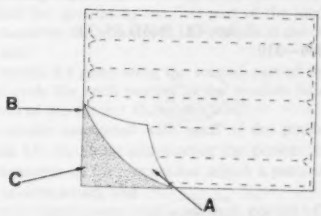
means for circulating pressure through said pneumatic cell in a selected direction of travel of said conveyer system.

4,124,116

LIQUID ABSORBING SECTIONAL PACK

Edward G. McCabe, Jr., 951 Wellesley Rd., Pittsburgh, Pa. 15206

Continuation-in-part of Ser. No. 768,844, Feb. 15, 1977, abandoned. This application Jan. 25, 1978, Ser. No. 872,340
Int. Cl.² B65D *81/26;* F17C *11/00*
U.S. Cl. 206—204 **6 Claims**



1. A moisture absorption pack comprising,

upper and lower contiguous sheet means bonded to each other at the outer most contiguous edges thereof to form an enclosure, at least one of said means being filter sheet means,

said enclosure being divided into a plurality of sectional compartments which are isolated from each other by dissolving barrier means,

said dissolving barrier means consisting essentially of a water soluble carboxy metal cellulose compound,

said sectional compartments each containing a predetermined quantity of absorbent granules, and

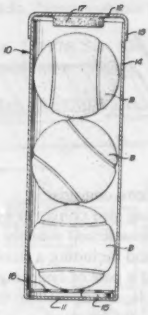
said barrier means functioning to dissolve when said granules have absorbed a predetermined amount of moisture so as to provide for an increased space in which to contain moist granules.

4,124,117

APPARATUS FOR REPRESSURING TENNIS AND SIMILAR PLAY BALLS

Marion F. Rudy, 19001 Vintage St., Northridge, Calif. 91324

Filed Oct. 14, 1977, Ser. No. 842,060
Int. Cl.[2] B65D *81/20, 85/00*
U.S. Cl. 206—213.1 **11 Claims**



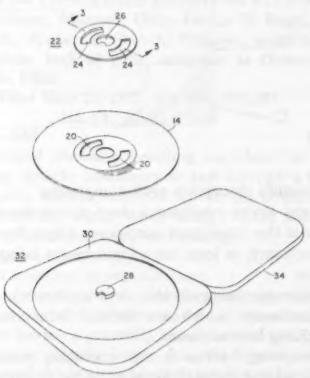
1. Apparatus for repressuring hollow permeable plays balls inflated by a first gaseous medium to above atmospheric pressure, comprising a container for receiving one or more of the balls, the interior of said container being at atmospheric pressure, and a means for providing a second gaseous medium in said container externally of one or more of the balls, the second gaseous medium being capable of diffusing through said one or more permeable balls to increase the pressure therein, said means being at atmospheric pressure and said second gaseous medium being differemt from said first gaseous medium.

4,124,118

ROTATIONAL RESTRAINT FOR A VIDEO DISC PACKAGE

James H. Helm, Elwood, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 26, 1977, Ser. No. 790,864
Claims priority, application United Kingdom, Aug. 9, 1976, 33097/76
Int. Cl.[2] B65D *85/30*
U.S. Cl. 206—310 **4 Claims**



1. A record package assembly comprising:

(A) a disc record having a central unrecorded region disposed between a centering aperture and an outer recorded region; said record having finger holes in said central unrecorded region which define rib portions, interposed between said finger holes and said centering aperture, and subject to finger grasping for facilitating record handling;

(B) a first member having a well for receiving said record and further having a non-circular post positioned for reception within the centering aperture of a record received in said well;

(C) removable means having a central opening dimensioned for engagement with the periphery of said noncircular post in a manner preventing rotational motion between said removable means and said first member, when said removable means is secured to said first member; said removable means including projecting portions dimensioned for engagement with walls of said finger holes for preventing rotational motion between a record and said removable means, when said removable means is secured to said first member during presence of said record in said well; and

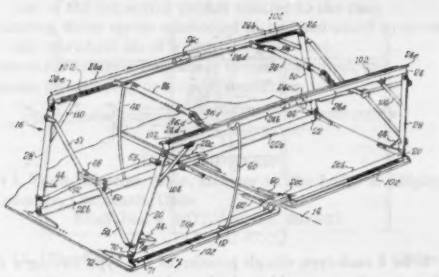
(D) a second member for enclosing said record in said well, when said members are juxtaposed.

4,124,119

AUTOMOBILE CARRIER FOR USE ON AIR CARGO PALLETS

Arnold B. Nordstrom, Torrance, Calif., assignor to Transequip Inc., El Segundo, Calif.

Filed Aug. 2, 1977, Ser. No. 821,245
Int. Cl.[2] B65D *85/68*
U.S. Cl. 206—335 **16 Claims**



1. An automobile carrier for use on air cargo pallets to carry two automobiles, one automobile over the other, on a structure locked transversely across two pallets, said structure being comprised of:

a first pair of rails and means for locking the two pallets to said rails to act as one, said first pair of rails being spaced and locked on said pallets for the tread width of an automobile to be supported by said first pair of rails,

four posts, one pivotally connected to and supported substantially upright at each end of said rails of said first pair,

a second pair of rails, each pivotally supported at its ends, in a position substantially parallel to said one pair, between the upper ends of a pair of said posts standing in a substantially upright position at the ends of one of said first pair of rails,

a plurality of spreader tubes between said second pair of rails for spacing said second pair of rails for the tread width of the automobile to be carried in the upper position,

four corner tie bars, one between each corner post and a connected rail for lateral stability of the structure in supporting an automobile in the upper position, and

an X-bar gate between the support posts for said second pair of rails at each end, whereby the pallets, spreader tubes and X-bar gates provide transverse stability for the carrier structure of the spacing of the upper and lower rails.

4,124,120

THIN-WALLED CUPS CAPABLE OF NESTING

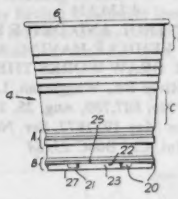
Robert H. Day, Bracknell, England, assignor to ITW Limited, Slough, England

Filed Apr. 28, 1977, Ser. No. 791,920

Claims priority, application United Kingdom, Apr. 28, 1976, 17152/76

Int. Cl.[2] B65D *21/02, 85/72*

U.S. Cl. 206—519 **1 Claim**



1. In a container formed from a uniform thickness thermoplastic sheet material, said container having a bottom wall and a sidewall diverging upwardly from the bottom wall to a rim at the open upper end thereof, said container further having a stacking and locking means formed in the sidewall of said container for releaseably interlocking a plurality of said containers in a nested relationship with an ingredient chamber between the bottom walls of adjacent containers, the improvement of said stacking and locking means comprising a lower stacking shoulder and an upper stacking shoulder a substantial distance above said lower stacking shoulder, said shoulders comprising annular surfaces lying in planes perpendicular to the longitudinal axis of said container and in substantial vertical alignment, a plurality of camming surfaces disposed in a spaced apart relationship circumferentially about said container and extending downwardly and inwardly from the radially outward edge of said lower stacking shoulder to resiliently urge said lower stacking shoulder from contact with the upper stacking shoulder of a nested container therebelow, a lower cylindrical wall portion extending upwardly from the radially outward edge of said lower stacking shoulder, an upper cylindrical wall portion extending upwardly from the radially outward edge of said upper stacking shoulder, the outer diameter of said lower cylindrical wall portion substantially equal to the inner diameter of said upper cylindrical wall portion to effect a seal therebetween, a frusto-conical lower wall portion extending upwardly and inwardly from the upper end of said lower cylindrical wall portion, a frusto-conical upper wall portion extending upwardly and inwardly from said upper cylindrical wall portion at substantially the same angle of inclination as said frusto-conical lower wall portion, and said upper cylindrical wall portion having a height relative to the height of said lower cylindrical wall portion to provide a seal between the inner surface of said frusto-conical upper wall portion of one of said containers and the outer surface of said frusto-conical lower wall portion of another nested sub-adjacent container with the camming surfaces of the superposed container resiliently urging the lower stacking shoulder thereof from contact with the upper stacking shoulder of the sub-adjacent container.

4,124,121

DOCUMENT SORTER SYSTEM HAVING INTERCHANGEABLE POCKET MODULES

Benjamin T. Sung, Southfield, and Richard C. Lumpkin, Laingsburg, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Mar. 7, 1977, Ser. No. 774,681

Int. Cl.[2] B07C *3/18*

U.S. Cl. 209—583 **16 Claims**

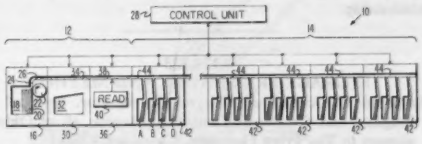
1. A document sorter for sorting a stack of documents into a plurality of discrete groups in accordance with information encoded on each of the documents relating to its group identification, comprising:

feed means for receiving the documents and feeding them in serial order into a first segment of a continuous document transport track;

read means for reading the encoded information on each document as it passes through a second segment of the continuous transport track;

document receiving means for receiving and storing each document in accordance with its group identification, the document receiving means being defined to include a plurality of concatenated pocket modules, each of the modules forming a successive segment of the continuous transport track and distinguishable from another module only by its position in the concatenation, each of the modules further having a plurality of pockets, each of the pockets having a one-to-one correspondence with one of the plurality of discrete groups and having a unique identification code in the concatenation of modules, each pocket further having associated with it a gate actuatable between a closed position and an open position to close and open the pocket;

document transport means for transporting each of the documents along the continuous document transport track;



control means, responsive to the read means, for receiving the information encoded on each of the documents and correlating it with a pocket select identification code; and

each module of said document receiving means further comprising:

coding circuit means for generating the unique identification codes corresponding to each of the pockets of the module, the identification code having a first part relating to the position of the module in the concatenation and a second part relating to the position of the pocket in the module, said coding circuit means being defined to include

first means for generating the first part of the identification code based on the position of the module in the concatenation, and

second means for generating the second part of the identification code for each pocket in the module based on the position of the pocket in the module;

storage means associated with each of the pockets of the module for receiving and storing the pocket select code representative of the pocket for which a particular document is designated; and

comparator means associated with each pocket of the module for comparing the pocket select code with the unique identification code for the pocket and enabling the gate to open upon favorable comparison.

4,124,122

TEST TUBE RACK

Ronald W. Emmitt, 28367 Ridgebrook, Farmington, Mich. 48024

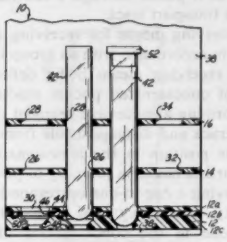
Continuation of Ser. No. 678,767, Apr. 21, 1976, abandoned. This application May 26, 1977, Ser. No. 800,700

Int. Cl.[2] B01L *9/06*

U.S. Cl. 211—74 **14 Claims**

1. A test tube rack for holding test tubes of a predetermined diameter, said rack comprising a plurality of spaced apart superimposed parallel plates comprising at least a top and a bottom plate, each of said plates having an array of apertures each for receiving a test tube, each of said apertures in one

plate having a diameter wider than the predetermined diameter of said test tubes and being vertically aligned with a corresponding aperture in each other plate, an annular circular groove formed about the periphery of each of said apertures in at least one plate, a toroidal resilient member in the form of an O-ring made of rubber-like material loosely disposed in said



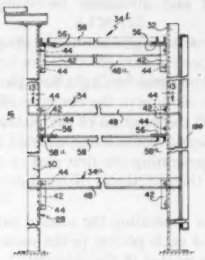
groove, said toroidal resilient member having an internal diameter slightly smaller than the predetermined diameter of said test tubes for peripherally resiliently grasping a test tube inserted through said aperture, and a pair of parallel sidewalls rigidly holding said plates in said superimposed spaced apart relationship.

4,124,123

STORAGE FRAMEWORK AND METHOD

Raymond Q. Armington; Wayne G. Atwater, both of Willoughby, and Charles F. Longaker, Mentor, all of Ohio, assignors to The Triax Company, Cleveland, Ohio

Filed Nov. 12, 1975, Ser. No. 631,186
Int. Cl.[2] A47F *5/00*
U.S. Cl. 211—186 **6 Claims**



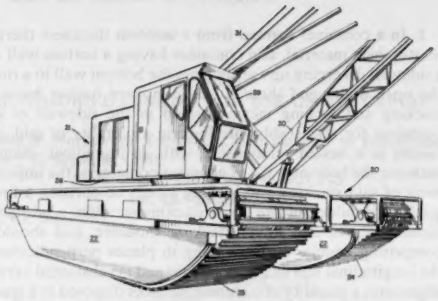
1. In a structural unit, such as for instance, a storage framework for a warehousing system, including a travel zone running alongside said storage framework for movement of a mechanical load carrier therein operable for depositing loads into and withdrawing loads from the storage framework, said storage framework comprising, spaced generally vertical load supporting hollow, polygonal, in horizontal cross section, column members, and connecting members extending laterally between respective pairs of said column members and being connected thereto by actuatable fastener means, at least certain of said column members comprising on one face thereof generally flat vertically spaced facial plates rigidly secured thereto in generally surface-to-surface relation with said fastener means being secured to the exterior face of the respective facial plate and projecting generally perpendicularly outwardly therefrom, each said connecting member including a cross portion disposed in confronting engaged relation with said exterior face of the respective facial plate and generally horizontal load support means secured to said cross portion, said fastener means extending from said respective facial plate through complementary openings in said cross portion and coacting between the latter and said respective facial plate to clamp said cross portion into tight surface-to-surface relation with the said respective facial plate, said cross portion being vertically elongated and extending vertically a substantial distance beyond the level of said load support means to rigidify the connection between the connecting member and the respective column member, and wherein said cross member is substantially vertically co-extensive with said respective facial plate.

4,124,124

HYDRAULIC CONTROL AND DRIVE SYSTEM FOR AMPHIBIOUS VEHICLE HAVING A TOPSIDE DRAGLINE DRAW WORKS THEREON

Huey J. Rivet, 6901 River Rd., Waggaman, La. 70094

Continuation of Ser. No. 607,739, Aug. 25, 1975, abandoned.
This application May 19, 1977, Ser. No. 798,461
Int. Cl.[2] B66C *23/84*
U.S. Cl. 212—69 **4 Claims**



4. For use with a vehicular undercarriage having a plurality of driven means, each means driven by a hydraulic propulsion motor, each said hydraulic propulsion motor being mounted upon said vehicular undercarriage and moveable therewith, and a dragline draw works constituting an upper carriage swivelly mounted on the top of the undercarriage for 360° horizontal rotation relative to the undercarriage, a hydraulic drive system mounted on the upper carriage comprising:

(a) a prime mover,
(b) a first gear box driven by said prime mover,
(c) a plurality of variable displacement pumps driven by said first gear box,
(d) a hydraulic motor driven by one of said hydraulic pumps,
(e) a second gear box driven by said hydraulic motor, said second gearbox controlling the actuation and speed response of said dragline draw works.
(f) a hydraulic swivel valve carried by said dragline draw works,
(g) hydraulic connection means between said swivel valve and said hydraulic pumps,
(h) hydraulic connecting means between said swivel valve and each hydraulic propulsion motor driving said driven means on said undercarriage, and
(i) operator controlled valve means for varying the hydraulic pressure delivered from said hydraulic pumps to the dragline draw works and to said propulsion motors.

4,124,125

ADVANCING APPARATUS FOR SPINE FIN TUBING

Walter J. Pohl, Anchorage, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Aug. 18, 1977, Ser. No. 825,611
Int. Cl.[2] B23Q *5/50*
U.S. Cl. 214—1 BB **7 Claims**

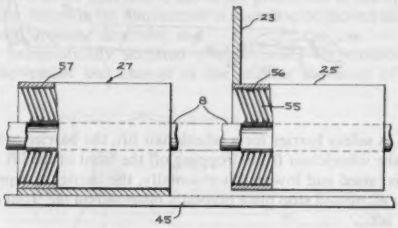
1. An apparatus for advancing spine fin heat exchanger tubing including a spine fin material having a base portion and

at least one fin portion slit to provide elongated fin members, said base portion being wound helically in close flatwise engagement with said tube surface with said elongated fin members extending radially therefrom, said apparatus comprising:

a body member having a passageway extending axially therethrough for coaxially receiving said spine fin heat exchanger tubing;

reciprocating means associated with said body member for moving said body member axially between an advancing stroke and a resetting stroke;

said passageway having a diameter less than the diameter of said spine fin heat exchanger defined by the distal ends of said fin members, so that the spine fin members are deflected rearwardly as the spine fin heat exchanger moves axially in said passageway relative to said body member;



means on the wall of said passageway providing a roughened surface that when engaged by said distal ends of said deflected spine fin members is sufficient to cause said heat exchanger to be moved axially with said body member during its advancing stroke; and

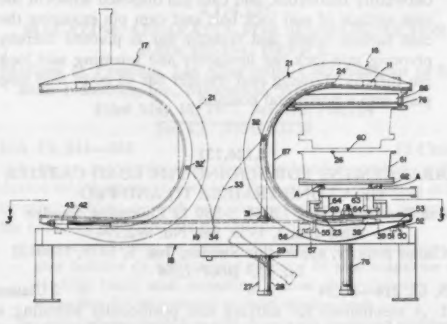
means for holding said spine fin heat exchanger against movement during the resetting stroke of said body member so that the distal ends of the angled fin members move across said roughened surface of said passageway wall and for allowing the engagement of the distal ends of said angled fin members with said roughened wall to move said spine fin heat exchanger axially.

4,124,126

ROLL-OVER MECHANISM

Edward D. Abraham, Brecksville, Ohio, assignor to Carver Foundry Products, Muscatine, Iowa

Filed Oct. 7, 1977, Ser. No. 840,121
Int. Cl.[2] B22C *17/08*; B65B *69/00*
U.S. Cl. 214—1 Q **27 Claims**



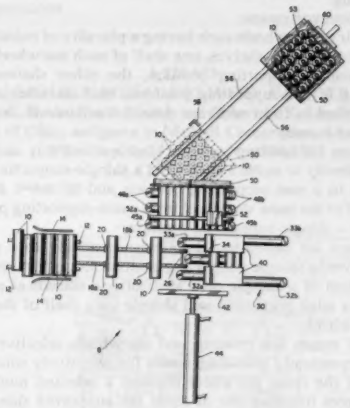
1. A roll-over machine for foundry equipment comprising a frame movable through substantially 180° between two positions, clamp and draw means on said frame movable from an equipment loading position in which foundry equipment may be loaded into said frame or removed therefrom and a clamp position, said clamp and draw means providing first and second opposed and spaced supports, said first support operating in response to movement of said clamp and draw means from said loading position to engage and support a two piece item of foundry equipment and to thereafter move such equipment to the clamp position for inversion as said frame turns through 180°, said second support operating to engage, and draw one of said pieces of equipment from the other in response to movement of said clamp and draw means from said clamp position after inversion of said frame.

4,124,127

MACHINE AND METHOD FOR PALLETIZING CYLINDRICAL ARTICLES

Gordon Vevang, 3625 Clubhouse La., Conyers, Ga. 30207

Filed Mar. 10, 1977, Ser. No. 776,112
Int. Cl.[2] B65G *57/28*
U.S. Cl. 214—6 C **4 Claims**



1. Apparatus for accumulating a plurality of cylindrical articles and for grouping them together in a stack comprising, in combination;

conveyor means for sequentially conveying cylindrical articles upwardly along a first incline and for sequentially dumping the articles into cradle means positionable adjacent the top of said first incline;

generally trough-shaped first cradle means mounted adjacent said conveyor means for receiving cylindrical articles dumped from said conveyor means and for collecting the articles in rows;

index means for indexing said cradle means downwardly along a second incline aside said first incline in steps as successive rows of cylindrical articles are collected in said cradle means;

roller means located alongside said first cradle means and defining a second cradle means which is aligned with said first cradle means when indexed to a lowermost position, so that a collection of rows of articles can be laterally transferred from said first cradle means to said second cradle means;

means for supporting a pallet aside said collection of articles which is transferred to said second cradle means, said pallet being supported in a generally vertical orientation and in article receiving alignment with said transferred collection of articles; and

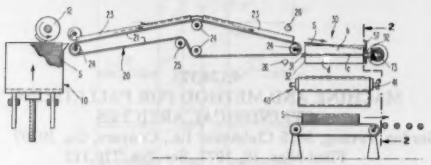
means operative to rotate said second cradle means to position which places said supported pallet in generally horizontal position with said collection of articles vertically supported on the pallet.

4,124,128

SHINGLE STACKING

Albert A. Adams, Malvern; Karoly G. Balogh, Springfield, and Tommy J. Prugh, Doylestown, all of Pa., assignors to Certainteed Corporation, Valley Forge, Pa.

Filed Oct. 14, 1977, Ser. No. 842,075
Int. Cl.[2] B65G *57/06*
U.S. Cl. 214—6 DK **10 Claims**



1. Apparatus for stacking shingles and like objects of generally rectangular shape and unequal thickness, said apparatus comprising:

a. a conveyor means;

b. a pair of starwheels each having a plurality of radially-disposed movable shelves, one shelf of each starwheel being in shingle-supporting position, the other shelves then being in non-supporting positions, said starwheels being disposed in front and rear positions relative to said conveyor means;

c. means for rotating said starwheels selectively and independently to move a shelf from a shingle-supporting position to a non-supporting position and to move another shelf of the same starwheel from a non-supporting position into a shingle-supporting position;

d. means for delivering shingles successively to a pair of shelves in shingle-supporting position to support one edge portion of a shingle on a shelf of one starwheel and the other edge portion of said shingle on a shelf of the other starwheel;

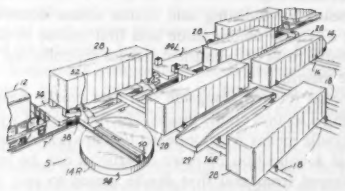
e. said means for rotating said starwheels selectively and independently including means for selectively rotating at least the front starwheel through a selected number of degrees to cause one or more self-supported shingles to drop onto said conveyor means without being flipped, or selectively rotating only the rear starwheel through a selected number of degrees to flip one or more shelf-supported shingles onto said conveyor means.

4,124,129

LOADER AND STORAGE SYSTEM

Leonard D. Barry, 19300 Pennington Dr., Detroit, Mich. 48221

Filed Jan. 20, 1976, Ser. No. 650,670
Int. Cl.[2] B65G *63/00, 67/02*; B60P *1/64*
U.S. Cl. 214—38 C **27 Claims**



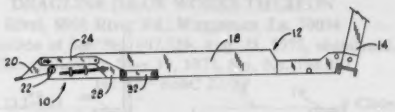
22. A loader for transfer of a load to or from a vehicle with relative movement past the loader, the loader having substantially horizontal, parallel, and equal crank arms having their pivots horizontally spaced apart, at least one (a) link connecting said arms into a parallelogram linkage, load transfer means on said link, said linkage being free to be moved about a transfer arc whereby a vehicle moving tangentially by the arc can engage the loader and move it around said arc to transfer a load with respect to the vehicle, and cam means for lifting and lowering said load transfer means for transfer of the load when tangent to the arc.

4,124,130

SAFETY BARRIER FOR A WHEELCHAIR LIFT

Donald L. Rohrs; Donald L. Collins, and Harold A. Downing, all of Hutchinson, Kans., assignors to Collins Industries, Inc., Hutchinson, Kans.

Filed Feb. 28, 1977, Ser. No. 773,075
Int. Cl.[2] B60R *3/02*
U.S. Cl. 214—75 R **3 Claims**



1. A safety barrier for a wheelchair lift, the barrier preventing the wheelchair from dropping off the front of the lift as the lift is raised and lowered horizontally, the barrier comprising:

an elongated stop plate pivotally mounted on the front of the lift;

a first and second pivot arm, one end of said pivot arms pivotally attached to the side of the lift, said first pivot arm pivotally attached to one end of a horizontal transfer bar, the other end of said horizontal transfer bar pivotally attached to said stop plate;

an elongated horizontal shoe, the ends of said shoe pivotally attached to the other end of said pivot arms, said shoe disposed below the horizontal surface of the lift, said shoe contacting the ground surface when the lift is lowered, said shoe pivoting said pivot arms when contacting the ground surface and pivoting said stop plate from a vertical position to a horizontal position;

biasing means for biasing said stop plate in a vertical position, said biasing means attached to the side of the lift and said first pivot arm; and

a lock bar disposed along the length of said transfer bar, one end of said lock bar pivotally attached to said stop plate, the other end of said lock bar having a cam surface, said lock bar having a "U" shaped indent for receiving a lock pin, said lock pin attached to and extending outwardly from the side of the lift, said indent receiving said lock pin therein when said stop plate is in a vertical position, said transfer bar including a cam pin attached to and extending outwardly therefrom, said cam pin disposed adjacent the cam surface of said lock bar, said cam pin engaging the cam surface when said transfer bar is pivoted thereby pivoting said lock bar upwardly and releasing said lock pin thereby allowing said transfer bar to pivot said stop plate into a horizontal position.

4,124,131

ARRANGEMENT FOR SLIDING THE LOAD CARRIER OF A LONG TRAILER TO AND FRO

Goran Torneback, Box 12046, S-580 12 Linkoping, Sweden

Filed Jun. 2, 1976, Ser. No. 692,194
Claims priority, application Sweden, Jun. 5, 1975, 7506422
Int. Cl.[2] B60P *1/64*
U.S. Cl. 214—83.24 **2 Claims**

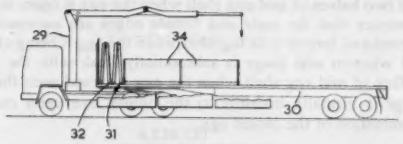
1. A mechanism for moving and positionally adjusting a slidably mounted load carrier longitudinally along a long trailer of a transport vehicle, said mechanism comprising:

(a) a downwardly-facing longitudinal channel member disposed on the underside of said load carrier,

(b) upper and lower rows of lugs extending along the length of said channel member,

(c) a rearwardly-directed linear double-acting piston hydraulic servomotor having a head portion on a piston rod,

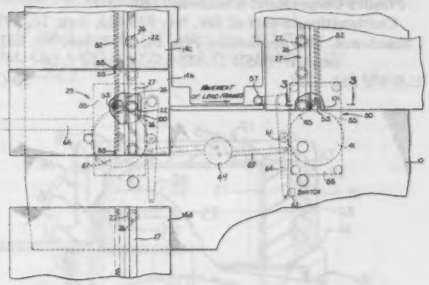
(d) said lugs being adapted to be operatively engaged by said head portion,
(e) said hydraulic servomotor being pivotally mounted on said trailer to pivot in a vertical plane between an upper limit position of maximum angular elevation and a lower limit position of lesser angular elevation,
(f) in said upper limit position, the piston rod head portion engages said upper row of lugs and cooperates therewith so that when the hydraulic servomotor operates to move the piston rod in one direction the load carrier is caused to be moved in the same direction,
(g) in said lower limit position of lesser angular elevation, the piston rod head portion engages said lower row of lugs and cooperates therewith so that when the hydraulic servomotor operates to move the piston rod in the opposite direction the load carrier is caused to be moved also in said opposite direction, and
(h) pneumatically actuated control means for controlling movement and change in the angular elevation of the



hydraulic servomotor between said lower limit and upper limit positions,
(i) said control means including a pneumatic servomotor to said hydraulic servomotor,
(j) said pneumatic servomotor including a casing and means for draining any water condensed within the interior of said casing out of said casing by force of gravity,
(k) the pneumatic servomotor is a single-acting diaphragm servomotor arranged with its diaphragm disposed in a substantially vertical plane within said casing,
(l) said draining means includes an opening located at the bottom of said pneumatic servomotor,
(m) the draining means of the pneumatic servomotor includes a float-operated drain valve disposed in the opening at the bottom of the casing,
(n) the hydraulic servomotor has an actuating arm depending therefrom adjacent said pivot mounting, and
(o) the pneumatic servomotor has an elongate operating member extending substantially horizontally and said member being pivotally connected to said actuating arm.

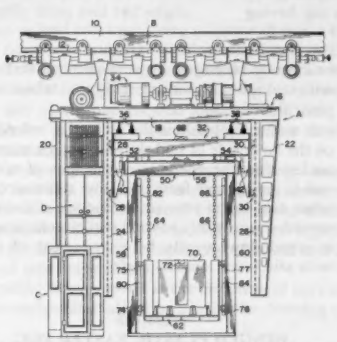
4,124,132
MAGAZINE APPARATUS FOR SEMICONDUCTOR PROCESSING DEVICE
Matheus D. Pennings, Los Altos Hills, Calif., assignor to Sola Basic Industries, Inc., Milwaukee, Wis.
Filed May 18, 1977, Ser. No. 798,114
Int. Cl.[2] B65G *65/36*
U.S. Cl. 214—301 **12 Claims**

1. In an automatic semiconductor bonder, prober or like device which operates with lead frames, trays, mounting strips or other holders or with semiconductor wafers; an apparatus for handling such holders or wafers comprising:
a magazine having an interior for receiving at least one of said holders or wafers, the exterior of said magazine including teeth and mounting means for mounting said magazine for movement on said device; and,
driving means coupled to said device for engaging said teeth to selectively provide said movement of said magazine relative to said device;
said teeth defining a rack on said magazine in-line with the direction of said movement;
said mounting means comprising an elongated channel on said exterior of said magazine generally parallel to said rack, said channel having an elongated outer opening more narrow than the inner width of said channel for engaging a T-shaped mount extending from said device;



whereby said holders or wafers may be removed from a plurality of said magazines for bonding, probing or other operations.

4,124,133
MOLTEN METAL DELIVERY CARRIER
George C. Rosin, South Euclid, and Robert E. Kulon, Willowick, both of Ohio, assignors to McNeil Corporation, Akron, Ohio
Filed Sep. 7, 1976, Ser. No. 720,558
Int. Cl.[2] B65G *47/00*
U.S. Cl. 214—707 **4 Claims**



1. A carrier for an overhead monorail material handling system especially adapted for delivering molten metal to a series of molds, said carrier comprising a first frame assembly adapted for travel along an overhead monorail and having adjacent to its opposite ends members providing vertical guideways for a second frame assembly movable vertically along said vertical guideways by a power actuated reversible hoist supported on said first frame assembly, said second frame assembly including horizontal members extending transversely of the length thereof providing horizontal guideways for a third frame assembly movable horizontally along said horizontal guideways by reversible power actuated mechanism connected thereto and to said second frame assembly, a ladle assembly including a molten metal ladle provided with a pouring spout carried by said third frame assembly for movement relative thereto in a vertical direction, a power actuated reversible hoist on said third frame assembly for raising and lowering said ladle assembly relative to said third frame assembly, and cooperating circular arcuate guideways on said third frame assembly and followers on said ladle assembly for pivoting said ladle assembly about the end of said ladle pouring spout upon any movement of said ladle assembly relative to said third frame assembly in a vertical direction.

4,124,134

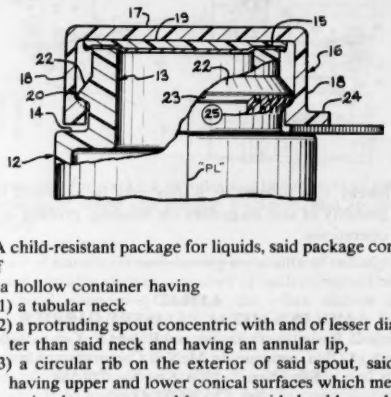
CHILD-RESISTANT PACKAGE FOR LIQUIDS

Gary V. Montgomery, Evansville, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.

Continuation-in-part of Ser. No. 823,433, Aug. 10, 1977, abandoned. This application Feb. 24, 1978, Ser. No. 881,130

Int. Cl.[2] **B65D** *55/02, 85/56;* **A61J** *1/00*

U.S. Cl. 215—224 **10 Claims**



1. A child-resistant package for liquids, said package consisting of

(a) a hollow container having

(1) a tubular neck

(2) a protruding spout concentric with and of lesser diameter than said neck and having an annular lip,

(3) a circular rib on the exterior of said spout, said rib having upper and lower conical surfaces which meet at a circular apex spaced between said shoulder and said lip, and

(b) a cap having

(1) a disc-like top,

(2) an annular skirt,

(3) a circular sealing element in said cap that cooperates with said spout for closing said spout when said cap is in place thereon, and

(4) an uninterrupted, annular inwardly extending means on the inner side of said skirt having a minimum diameter less than the diameter of the apex of said spout rib and being spaced from said top a distance such that when said cap is pressed on said spout and said means moved downwardly beyond said circular apex, said cap is urged downwardly by engagement of said means with said lower conical surface.

4,124,135

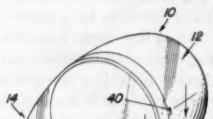
HINGED PLASTIC EASTER EGG

Erwin H. Weder, Highland, Ill., and Donald E. Weder, Hobart, Okla., assignors to Highland Manufacturing and Sales Co., Inc., Highland, Ill.

Filed Dec. 17, 1976, Ser. No. 751,963

Int. Cl.[2] **B65D** *11/02, 81/36*

U.S. Cl. 220—4 B **1 Claim**



1. An Easter egg having an open position and a closed position, comprising a one-piece, hollow shell of plastic material divided into two halves with the two halves being connected by a narrow, thin, flexible hinge of plastic material of integral construction with the two halves and enabling limited universal relative movement of the two halves and flexing of the edges of the halves when the egg is open, and means providing a continuous latch engagement about the full periphery of each of said halves along the line of separation between the two halves, said latch engagement means including a continuous male reduced edge area, including an essentially horizontal shoulder, on one of the halves of the shell and a continuous female reduced edge area on the other half of the shell for telescopic engagement, one of the reduced edge areas including a continuous peripheral groove formed about the full periphery of said reduced edge area and the other reduced edge area including a continuous peripheral rib formed about the full periphery of said reduced edge area, the rib being frictionally and resiliently received in the groove for releasably securing the halves of the egg together when closed, said hinge consists of only a single "living" hinge strip disposed exteriorly of the egg shell when the egg is closed, said hinge strip being anchored to the outer edge of the shoulder of the male reduced edge area and the outer edge of the female reduced edge area, and said hinge being of such a length as to retain alignment of said two halves of said egg shell when the egg is open, in such a manner that the male and female edges are automatically aligned and forced to fit together when the egg is being closed, and wherein said hinge is substantially flush with the outer surface of said egg shell when the egg is closed such that the hinge is virtually invisible to the human eye upon cursory examination of the closed egg.

4,124,136

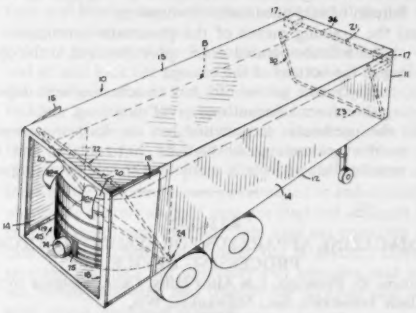
CONTAINER LINER FRAME SUPPORT KIT

Ronald W. Bjelland, Valley Stream; Charles A. Narwicz, Greenlawn, both of N.Y., and Casimir Hetmanski, Westfield, N.J., assignors to United States Lines, Inc., New York, N.Y.

Division of Ser. No. 416,580, Nov. 16, 1973, Pat. No. 4,054,226. This application Aug. 18, 1975, Ser. No. 608,470

Int. Cl.[2] **B60P** *7/00;* **B61D** *17/18;* **B62D** *33/04;* **B65D** *25/16*

U.S. Cl. 220—68 **7 Claims**



1. A kit of component parts capable of being assembled and installed adjacent the rear doorway of a van-type cargo container to support a bulk cargo liner bag within the container, said kit comprising a transverse bulkhead of flexible sheet material, and frame means adapted to support said bulkhead adjacent said rear doorway, said frame means including a pair of said members having respective upper and lower ends of equal length which is greater than the interior height of said container, a cross-member having respective opposite ends and length which is substantially equal to the interior width of said container, said side member upper ends and said opposite ends of the cross-member being adapted to be connected together to connect the cross-member opposite ends to the respective of said side member upper ends to space the side members apart, and a plurality of transverse bulkhead support straps, said transverse bulkhead having a height which is less than the interior height of said container and width to extend between said side members when spaced apart by said cross-member,

and each said bulkhead support strap having respective opposite ends adapted to be connected to the respective of said side members for extending the strap therebetween, said plurality of straps having unequal and progressively longer lengths the shortest of which is at least as long as said cross member, whereby, when said cross-member is connected between said side member upper ends and said straps are connected to and extend arcurately between said side members in vertically spaced apart relation therealong in the order to their said progressive lengths with the longest strap adjacent to said side member lower ends, and when said frame means is positioned within the container with its said side members extending angularly and upwardly from their lower ends adjacent the container floor towards the container doorway, the different lengths of said plurality of straps provide a vertically arranged, curved lateral support to hold said bulkhead in vertical orientation.

4,124,137

EXHAUST GAS VENT TUBE

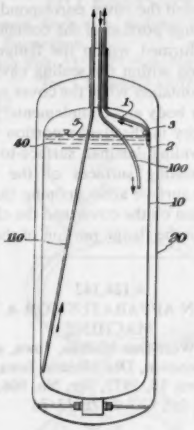
Jürgen Hesse, Düsseldorf, and Dieter Schulzki, Duisburg, both of Germany, assignors to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed Jan. 24, 1977, Ser. No. 761,774

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1976, 2605321

Int. Cl.[2] B65D *3/18, 25/00*

U.S. Cl. 220—86 R **5 Claims**



1. In an upright cryogenic vessel having a filling pipe for filling the vessel with a low-boiling cryogenic liquid to a predetermined level in the vessel and having a vertically extending exhaust tube in the vessel extending to the predetermined level and leading to the exterior of the vessel for discharging exhaust gas which occurs during the filling process whereby the occurrence of liquid in the exhaust tube indicates the completion of the filling process and the reaching of the predetermined level by the liquid, the improvement being said exhaust tube including deflection means for separating droplets of liquid by deflection of the exhaust gas stream, said exhaust tube being closed at its end below said predetermined level and having a side inlet opening at said predetermined level to comprise said deflection means.

4,124,138

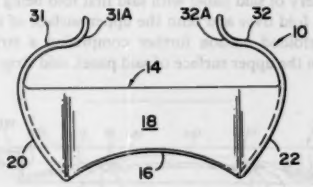
PROTECTIVE DEVICE

William Saliba, 4206 Skipper Rd., Apt. 80, Tampa, Fla. 33602, and Juliana M. Hoefling, 9712½ N. 14th St., Tampa, Fla. 33612

Filed Aug. 8, 1977, Ser. No. 822,701

Int. Cl.[2] A47G *19/22;* A61J *7/00;* B65D *41/32*

U.S. Cl. 220—90.2 **1 Claim**



1. An integral protective device for use with a drinking container having a circular opening surrounded by a drinking rim, the device comprising in combination:

a substantially horizontal shield for shielding a portion of the top opening in the drinking container;

said shield having two side edges that traverse across portions of said opening; said side edges bounded by two arcuate end edges defining opposing chrdal sections of a circle;

a first and a second partially circular tab integrally extending downwardly from said end edges;

said first and second tabs contacting portions of the circular drinking rim of the drinking container when said shield is positioned over the opening in the drinking container;

an aperture means comprising a cut out region extending through said shield and located adjacent said first and second tab for providing controlled liquid flow through said aperture means;

a first and a second arm respectively extending laterally from said first and second tabs and extending about portions of the circumferential lateral surface of the drinking container; each of said first and second arms having a first inwardly arcuate contour immediately adjacent said first and second tabs respectively;

said first contour being curved in the direction of curvature of the circumferential lateral surface of the drinking container;

each of said first and second arms having a second contour;

said second contour being curved in a direction opposite to the direction of curvature of the circumferential lateral surface of the drinking container and defining first and second arm contact portions;

resilient means integrally established between each of said first and second tabs and said first and second arms for resiliently grasping the circumferential lateral surface of the drinking container with said first and second tabs and said first and second arm contact portions; and

said first and second arms being resiliently deformable for adjusting said first and second arms to resiliently grasp liquid containers of various sizes with said first and second arm contact portions.

4,124,139

METAL CAN LID WITH A PUSH-IN OPENING DEVICE FOR CANS HAVING PRESSURIZED CONTENTS

Edward L. Benno, Grayslake, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

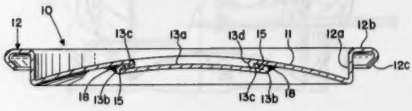
Filed Jan. 25, 1978, Ser. No. 872,397

Int. Cl.[2] B65D *41/32*

U.S. Cl. 220—268 **5 Claims**

1. A metal can lid with a push-in opening device for cans having a pressurized contents, said opening device comprising

a panel formed in said lid from the material of said lid, the material of said lid being a metal sheet sufficiently thin and flexible to be easily bent by a person in a single thickness portion thereof, said panel having an area substantially smaller than the area of said lid but large enough to be pushed by a person's finger downwardly into a can to which said lid is applied, at least a substantial circumferential portion of said panel formed as an underfolded section of said material, said underfolded section comprising a first fold of said material at the periphery of said panel with said first fold being a substantially 180° fold over and onto the upper surface of said panel, said underfolded section further comprising a strip of said material on the upper surface of said panel, said strip extending



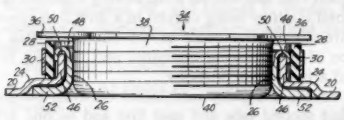
longitudinally substantially the length of said underfolded section with one longitudinal edge thereof integral with the end of said first fold on the upper surface of said panel and with the other longitudinal edge thereof integral with one end of a second fold of said material, said second fold of said material being a substantially 180° fold over and onto the upper surface of said strip with the other end thereof merging integrally into the material of said lid circumferentially about said panel, a substantial longitudinal segment of said strip having a line of fracture completely through said material, whereby said first fold and the portion of said strip integral therewith provide an edge reinforcement of said panel against bending of said panel by a person's finger pushing downwardly on said panel adjacent said line of fracture.

4,124,140

GASKETED FLANGE SEALER

Michael J. Ziegler, East Brunswick, N.J., and Thomas D. Lee, Chattanooga, Tenn., assignors to Allen-Stevens Corporation, Somerset, N.J.

Filed Mar. 2, 1978, Ser. No. 882,594
Int. Cl.² B65D *53/00*
U.S. Cl. 220—304 **15 Claims**



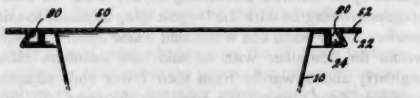
1. A closure for an opening in a surface of a drum, said closure comprising a cylindrical sleeve, said sleeve being mounted in and being coaxial with the opening in the drum surface, the inner surface of said sleeve being threaded, an externally threaded cylindrical cap, the threads of said cap engaging the threads of said sleeve, said cap having an annular circular lip at the outer end thereof about its outer periphery, said lip extending substantially perpendicularly to said sleeve adjacent the outer end of said sleeve, an outer portion of said lip being parallel to the drum surface, and a flexible resilient cylindrical gasket, said gasket being coaxial with said cap and sleeve and being located externally to said sleeve, said gasket lying between said lip and the drum surface, so that when said cap is screwed inwards into said sleeve, said lip compresses said gasket against the surface of the drum so that said gasket forms a closure seal against fluid flow out of said drum.

4,124,141

STERILE CONTAINER

James L. Armentrout, 21 Barlovento Ct., Newport Beach, Calif. 92663, and George H. Schneider, 22475 Overlake Dr., El Toro, Calif. 92630

Filed Jul. 11, 1977, Ser. No. 814,159
Int. Cl.² B65D *43/02*
U.S. Cl. 220—306 **15 Claims**



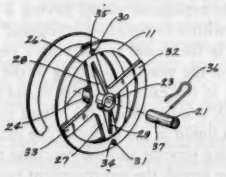
1. A sterile container, including
a container having side walls disposed in a closed loop and having a closed bottom end and having an open top end for receiving an item to be maintained in a sterile environment and formed from a heat formable flexible plastic material and including a flange portion extending in a closed loop around the container body at the open top end,
a sealing cavity formed within the flange portion of the container body and extending throughout the closed loop defined by the flange portion and including an opening having a particular dimension across the opening and having an increased dimension across the opening at progressive positions into the cavity, relative to the dimension at the opening of the cavity, for a major portion of the depth of the opening,
a cover for closing the open end of the container body, the cover being formed from the heat formable flexible plastic material and including a flange portion extending in a closed loop around the cover corresponding to the closed loop for the flange portion of the container body, and
a sealing cavity formed within the flange portion of the cover and nested within the sealing cavity in the flange portion of the container when the cover seals the open end of the container body and complementary to the shape of the sealing cavity in the flange portion of the container body and providing laminar surface-to-surface contact between the mating surfaces of the sealing cavities throughout the surface areas defining the closed loop of the flange portion on the cover and the closed loop of the sealing cavity in the flange portion of the container.

4,124,142

CONNECTION APPARATUS FOR A VENDING MACHINE

Henry J. Albright, West Des Moines, Iowa, assignor to Fawn Engineering Corporation, Des Moines, Iowa

Filed Jun. 15, 1977, Ser. No. 806,738
Int. Cl.² G07F *11/36*
U.S. Cl. 221—75 **7 Claims**



1. Connection apparatus for a vending machine comprising:
a helically shaped member, said helically shaped member having a first opening disposed in a convolution on one

end thereof, a second opening being disposed in said convolution and oriented 180° from said first opening;

a drive shaft for selectively rotating said helical member;

means for connecting said drive shaft to said helical member comprising:

a hub section;

means for attaching said hub section to said drive shaft;

a first arm member extending radially from said hub section in a first direction to a position on one side of said convolution;

a first projection disposed on one side of the outermost end of said first arm member, said first projection being disposed in said first opening of the helically shaped member;

a second arm member extending radially from said hub section in a second direction opposite to said first direction, and extending to a position on said one side of said convolution;

a second projection disposed on one side of the outermost end of said second arm member, said second projection being disposed in said second opening of the helically shaped member;

a third arm member extending radially from said hub section in a third direction, the outermost end of said third arm member being disposed on the other side of and in abutment with said convolution;

a fourth arm member extending radially from said hub section in a fourth direction, the outermost end of said third arm member being disposed on said other side of and in abutment with said convolution; and

at least one of said first, second, third, and fourth arm members being resilient whereby said first and second projections are held tightly in said first and second openings of the helically shaped member.

4,124,143

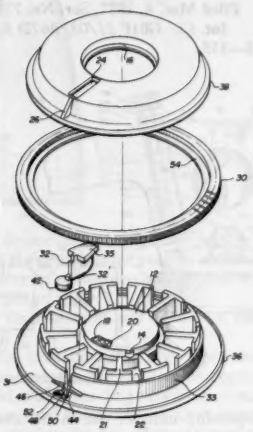
PILL DISPENSER

Michael D. Thomas, Arab, Ala., assignor to Ryder International Corporation, Barrington, Ill.

Filed Feb. 11, 1977, Ser. No. 767,682

Int. Cl.[2] B65D *83/04*

U.S. Cl. 221—82 **8 Claims**



3. A pill dispenser comprising; a base member having formed thereon a raised central hub portion and a plurality of radially disposed compartments concentric with said hub portion, a cover member rotatably mounted on said hub portion and having a pill exit port formed therein for permitting selectively the exit of a pill from one of said compartments while covering the others of said compartments, releasable locking means formed on said cover member and said base member, which when engaged prevent relative rotation of said cover member, said releasable locking means comprise a plurality of projections formed on said rotatably mounted cover member and means on said base member defining a slot for receiving and holding one of said projections, and an actuator member carried by said base member and including detent means aligned with said slot, such that movement of said actuator will cause said detent means to engage a projection in said slot and displace said projection from said slot thereby freeing said cover member for rotation.

4,124,144

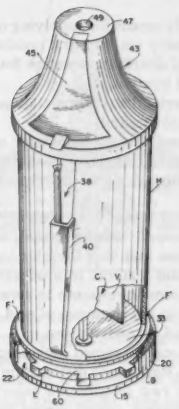
BEVERAGE STRAW DISPENSER

John R. Radek, Hinsdale, Ill., assignor to Ready Metal Manufacturing Company, Chicago, Ill.

Filed Apr. 25, 1977, Ser. No. 790,473

Int. Cl.[2] A47G *19/30;* **B65H** *3/06*

U.S. Cl. 221—191 **6 Claims**



4. A beverage straw dispenser comprising,

(a) a unitary substantially cylindrical straw container having a concave floor and a vertically elongated side window for straw egress,

(b) a cover for said container having a central perforation and a straw loading aperture therein,

(c) a shallow base member and a rotary actuator disk housed therein having radial peripheral projections, both said member and said disk having a small central opening therein in alignment with said perforation in said cover,

(d) a vertical rod extending through said container between said cover and base and through said perforation and central openings, with fastening means at the opposite ends thereof for maintaining the parts in assembled condition,

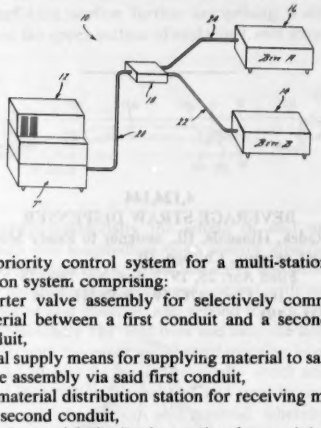
(e) said hollow base member having an arcuate opening in its periphery providing digital access to said projections on said disk, and

(f) radial vanes on said axial rod at the lower portion of said container provided with flexible outer portions for pushing the straws in said container toward said window for egress therethrough.

4,124,145
DIVERTER VALVE ASSEMBLY AND PRIORITY CONTROL CIRCUIT FOR ICE DISTRIBUTION SYSTEMS

Joseph R. Spinner, and Melvin A. Baker, both of Albert Lea, Minn., assignors to King-Seeley Thermos Co., Ann Arbor, Mich.

Continuation-in-part of Ser. No. 691,355, Jun. 1, 1976, Pat. No. 4,055,280. This application Oct. 21, 1977, Ser. No. 844,441
Int. Cl.[2] F25C 5/18
U.S. Cl. 222—56 11 Claims



1. A priority control system for a multi-station material distribution system comprising:

a diverter valve assembly for selectively communicating material between a first conduit and a second or third conduit,

material supply means for supplying material to said diverter valve assembly via said first conduit,

a first material distribution station for receiving material via said second conduit,

a second material distribution station for receiving material via said third conduit,

first and second sensing means for sensing the quantity of said material in respective of said first and second stations and generating a signal in response to a predetermined quantity,

priority control means for receiving said signals from said first and second sensing means, actuating said material supply means and said diverter valve assembly so as to distribute said material to a selected one of said first and second stations in response to receipt of said signal without regard to the presence of said signal from another of said first and second stations,

said priority control means including priority selection circuit means, station one distribution priority circuit means, and station two distribution priority circuit means, said priority selection circuit means being operable to selectively allow actuation of station one or station two distribution priority circuit means in response to receipt of said signal by the corresponding distribution priority circuit means.

4,124,146
FLUID METERING DEVICE

Andrew I. Sealfon, 305 W. 13th St., New York, N.Y. 10014

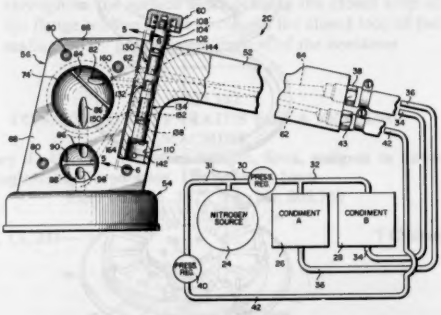
Filed Jan. 29, 1976, Ser. No. 653,504
Int. Cl.[2] B67D 5/30
U.S. Cl. 222—70 2 Claims

1. A fluid metering device for dispensing a selected fluid volume comprising a combination of an electrically operated pump of the type adapted to pump a discrete volume of said fluid in response to each electrical pulsing thereof, said pump having an inlet and an outlet and a solenoid which is adapted to cause pumping operation thereof when electrically pulsed, said pumping operation consisting of the dispensing of a discrete fluid volume for each electrical pulse, and a source of said dispensed fluid having a first conduit connected to supply said fluid to said pump inlet, a second conduit connected from said pump outlet to deliver said dispensed fluid to a prescribed point of use, an electrically operated solenoid valve strategically located in said conduit adjacent said point of use effective to maintain said second conduit fully charged with fluid between said pump outlet and said point of use, an electrical circuit operatively connected to operate said pump including pulsing means for successively transmitting electrical pulses to said pump at a selected constant frequency and simultaneously therewith to pulse said solenoid valve into an open condition to allow the exiting flow therethrough of fluid, and means including a timer operatively connected to initiate the commencement of the operation of said pulsing means and the subsequent termination thereof after a selected duration of time such that said pulsing means transmits said pump-operating electrical pulses to said pump solenoid during said duration of time at said selected constant frequency, whereby the fluid volume dispensed at said point of use by said fluid metering device is the sum of said discrete volumes dispensed by said pump for the number of electrical pulses transmitted to said pump during the operating interval thereof as determined by said timer.

4,124,147
FLEXIBLE DIAPHRAGM DISPENSING SYSTEM FOR CONDIMENTS

Werner K. Priese, Barrington; Jerry C. Janquart, Crystal Lake, and Deryl B. Stanley, Elgin, all of Ill., assignors to Hills-McCanna Company, Carpentersville, Ill.

Filed Mar. 4, 1977, Ser. No. 774,268
Int. Cl.[2] G01F 11/08; B67D 5/52
U.S. Cl. 222—135 23 Claims



10. A dispensing unit for use in the controlled, metered dispensing of a liquid product supplied to said unit under pressure, said unit including: a metering chamber defined by a cavity having a flexible, relatively movable diaphragm member engaged thereover to define an opposed wall surface of said chamber; first valve means providing for the supply of liquid product under pressure to said metering chamber; second valve means for controlling the flow of liquid product from said chamber to discharge passage means provided by said unit for the dispensing of said product; and control means for the selective and alternate application of a pressurized

medium, said pressurized medium being employed to effect the opening and closing of said first and second valve means, with the flow thereof being controlled by a valve member, said valve member being biased to a first position wherein the side of said diaphragm opposite said side forming part of said chamber is vented and said first valve means is open while said second valve means closed, with said valve member being movable to a second position to pressurize said metering chamber diaphragm, while opening said second valve means and closing said first valve means, such that said first valve means may be opened and said second valve means closed when said opposite side of said diaphragm is vented to permit liquid product under pressure to enter and fill said metering chamber, with operation of said valve means to the second position opening said second valve means and closing said first valve means, and effecting the supply of said pressurized medium to said opposite side of said diaphragm, which will force said diaphragm toward said cavity wall surface to expel a predetermined quantity of liquid product from said metering chamber.

4,124,148

APPARATUS FOR A CONTAINER WITH AN ATOMIZER FOR, IN PARTICULAR, COSMETIC FLUIDS

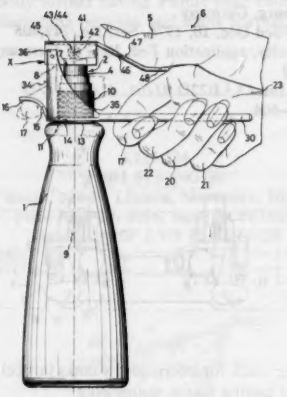
Werner Vieler, and Karl Vieler, both of Herne, Fed. Rep. of Germany, assignors to Firma Carl Vieler, Herne, Fed. Rep. of Germany

Filed Nov. 15, 1976, Ser. No. 741,714

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1975, 2558645; Aug. 13, 1976, 7625457; Oct. 29, 1976, 2649326

Int. Cl.[2] G01F *11/02*

U.S. Cl. 222—321 **6 Claims**



1. An actuating device for a container having a pump axially mounted on top of the container for radially discharging atomized fluids responsive to pressure axially applied to the pump, said device comprising:

a base member for mounting said device on said pump or container;

a bracket means mountable on said base member, said bracket means having a pair of arms on opposite sides of the pump, said arms extending upwardly along and adjacent to the pump and terminating in pivot points spaced in a direction normal to the axis of the container and pump and located at an axial position approximating the top of said pump, said pivot points being radially spaced from said pump in the direction of discharge by a small distance;

a lever having one end pivotally mounted at said pivot points, said lever having an intermediate portion positioned across the top of said member for contacting said pump at a point closely spaced from said pivot points, said lever having a bent portion beyond said intermediate portion, said bent portion slanting downward, and a second end of said lever shaped to accommodate the thumb of the user for depressing said lever and pump and discharging atomized fluid, and

a hand grip having a pair of projections extending radially from opposite sides of said base member, one of said projections being suitable for engaging the index finger of the user, the other of said projections receiving the remaining fingers of the user.

4,124,149

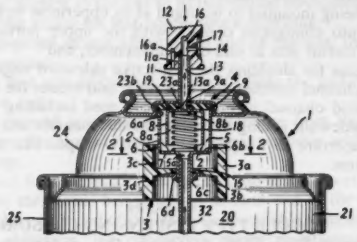
AEROSOL CONTAINER WITH POSITION-SENSITIVE SHUT-OFF VALVE

Joseph G. Spitzer, 44 Coconut Row, Palm Beach, Fla. 33480; Marvin Small, 1100 Park Ave., New York, N.Y. 10028; Lloyd I. Osipow, 2 Fifth Ave., New York, N.Y. 10003, and Dorothea C. Marra, 107 Fernwood Rd., Summit, N.J. 07901

Continuation-in-part of Ser. No. 706,857, Jul. 19, 1976, abandoned. This application Dec. 27, 1976, Ser. No. 754,471

Int. Cl.[2] B65D *83/14*

U.S. Cl. 222—402.19 **41 Claims**



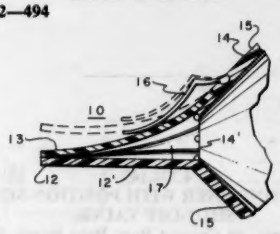
1. An aerosol container for use with compositions containing liquefied flammable propellants, and having a shut-off valve closing off flow through an open manually-operated delivery valve whenever the container is tipped from the upright position beyond the horizontal towards the fully inverted position, the container comprising, in combination, a pressurizable container having at least one storage compartment for an aerosol composition and a liquefied propellant in which compartment propellant can assume an orientation according to orientation of the container between a horizontal and an upright position, and a horizontal and inverted position; a delivery valve movable manually between open and closed positions, and including a valve stem and a delivery port; an aerosol-conveying passage in flow connection at one end with the storage compartment and at the other end with the delivery port, manipulation of the delivery valve opening and closing the passage to flow of aerosol composition and propellant from the storage compartment to the delivery port: all flow between the storage compartment and the delivery port preceeding via the aerosol-conveying passage; and a shut-off valve responsive to orientation of the container to move under the force of gravity between positions opening and closing off flow at least of liquefied propellant to the delivery port, the shut-off valve being positioned across the aerosol-conveying passage in the line of flow from the storage compartment to the delivery port, and moving into an open position in an orientation of the container between the horizontal and an upright position, and moving into a closed position in an orientation of the container between the horizontal and an inverted position.

4,124,150

SELF-CLOSING CONTAINER OUTLET

Norman W. Moss, 215 S. 11th Ave. Suite D, Yakima, Wash. 98902

Continuation of Ser. No. 445,198, Feb. 25, 1974, abandoned.
The portion of the term of this patent subsequent to Sep. 7, 1994 has been disclaimed.
This application Aug. 18, 1975, Ser. No. 602,696
Int. Cl.[2] B65D *37/00*
U.S. Cl. 222—494 **9 Claims**



1. A self-closing container outlet for resilient containers to be mounted to the aperture of the neck of said dispenser, comprising:

a channel member having a flat member issuing from one side of said aperture, parallel to the rectilinear axis of said neck;

a reed being a stiffly flexible semi-rigid strip fastened to each side of said channel member on said aperture, said reed being mounted to be urged at its uppermost terminal end into contiguous contact with the upper portion of the interior side of said channel member; and

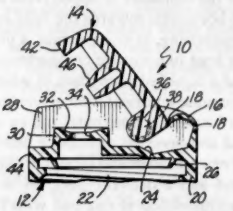
means for shielding the respective sideward edges of said channel member and said reed, said means for enclosing said channel member and said reed including a pair of sidewalls issuing from said channel member and from said aperture in a square-cornered U-shaped-like configuration.

4,124,151

TOGGLE TYPE DISPENSING CLOSURE

Robert E. Hazard, N. Kingstown, R.I., assignor to Polytop Corporation, Slatersville, R.I.

Filed Nov. 22, 1976, Ser. No. 743,922
Int. Cl.[2] B65D *43/24*
U.S. Cl. 222—498 **7 Claims**



1. A dispensing closure including a first closure part having an opening extending therethrough, a second closure part pivotally mounted on said first closure part so as to be capable of being rotated about a pivot axis between a closed position in which said second closure part closes off said opening so that material cannot pass therethrough and an open position in which said opening is exposed so as to permit material to pass therethrough and spring means connecting said first and second closure parts for holding said second closure part in either of said positions in which the improvement comprises:

said spring means comprising a spring having ends, one of which ends is pivotally connected to said first closure part and the other of which ends is pivotally connected to said second closure part,

said first closure part having an upwardly opening cavity, the bottom of which is located below said pivot axis, said cavity having an upstanding wall, said one of said ends of said spring means being connected to said wall above said bottom of said cavity,

said spring being connected to said second closure part at a location which is spaced so as to permit said other end of said spring which is connected to said second closure part to be pivoted toward said first closure part as said second closure part is pivoted from said closed to said open position,

said cavity and said closure parts being dimensioned so as to accommodate movement of said second closure part and said other end of said spring into said cavity as said second closure part is pivoted between said positions and so that the distance between the ends of said spring is decreased so as to compress said spring as said second closure part is moved between said positions,

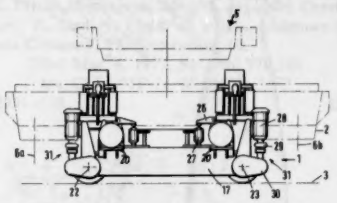
said first and said second closure parts and said spring are integral with one another and are constructed of a polymer material having resilient, flexible physical properties.

4,124,152

TRUCK FOR TRANSFER TANKS IN METAL PLANTS, PARTICULARLY FOR STEEL STRAND CASTING PLANTS

Franco Fioravazzi, Duisburg, Germany, assignor to Demag, A.G., Duisburg, Germany

Filed Dec. 10, 1976, Ser. No. 749,405
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1975, 2557769
Int. Cl.[2] B22D *41/04, 41/08, 41/12*
U.S. Cl. 222—604 **12 Claims**



1. A transfer truck for intermediary tanks in steel mills, such as steel strand casting plants, comprising

(a) a frame including a pair of longitudinally extending side beams and a pair of crossbeams extending between said side beams;

(b) means on said frame for adjusting an intermediary tank supported by said truck, said adjusting means including a vertical hoisting device, a tank horizontal positioning device, a tank tilting device, a weight measuring device; characterized by

(c) operating means for all said adjusting means disposed on one side of said transfer truck;

(d) a casting ladle and support therefor for charging a tank supported on said truck positioned on the side of said truck opposite said operating means;

(e) a pair of axles extending between said side beams and supported therein;

(f) wheels disposed on each end of said pair of axles;

(g) each end of each said crossbeam supported on said side beams by a hoisting gear; and

(h) each said hoisting gear positioned on said side beams adjacent said axles.

4,124,153
TOOL FOR USE IN MAKING HOOKED RUGS
John J. Mann, 8015 Harwood Ave., Wauwatosa, Wis. 53213
Filed May 18, 1977, Ser. No. 797,910
Int. Cl.[2] D05B *85/00*
U.S. Cl. 223—102 **3 Claims**

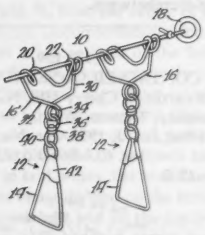
1. A rug maker's tool by means of which yarn can be looped around the filaments of a net-like base for the making of a hooked rug, said tool being characterized by:

A. an elongated body having one end portion thereof formed as a handle and having a hook at its other end which curves around to have its extremity project substantially towards the first-mentioned end of the body;

B. said body having a shank portion extending from said hook in the direction towards the handle; and

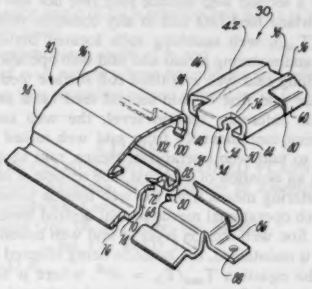
C. said body further having a knife edge extending lengthwise therealong between said shank portion and said handle.

4,124,154
FISH STRINGER
Lorence O'Russa, 314 N. Lincoln, Metamora, Ill. 61548
Filed May 17, 1976, Ser. No. 687,015
Int. Cl.[2] A45F *3/00*; F16G *11/00*
U.S. Cl. 224—7 E **4 Claims**



1. A fish stringer comprising a flexible line and a plurality of fish holders, each of said fish holders comprising a link adapted for sliding attachment to said line and a fish clip connected to said link, said link comprising a closed loop of relatively stiff wire conformed to provide at the ends of one side thereof a pair of oppositely wound coils extending through more than 360°, said coils having a common axis, an inside diameter greater than the diameter of said line and the turns of each coil spaced by a distance greater than the diameter of said line, the length of said side including said coils being the greatest dimension of said loop, said line extending centrally through both of said coils of each of said holders, said sides constituting spacers for the clips of adjacent holders.

4,124,155
LUGGAGE RACK
Gerald L. Kowalski, Royal Oak, Mich., assignor to Four Star Corporation, Troy, Mich.
Filed Aug. 11, 1977, Ser. No. 823,670
Int. Cl.[2] B60R *9/04*
U.S. Cl. 224—42.1 D **11 Claims**



1. A luggage rack bed, comprising:

(a) a slat,

(b) a flexed elongated strap having first and second opposed ends disposed substantially perpendicular to the slat,

(c) means for interconnecting the slat to the strap to enable a load applied to the bed to be distributed throughout the bed, the means for interconnecting comprising:

a tab disposed at one longitudinal end of the slat, the tab comprising:

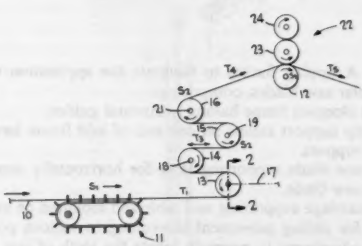
(1) a first arm projecting outwardly from the end of the slat, and

(2) a second arm downwardly depending from the first arm, the second arm being interengageable with the strap,

(d) means for rigidly connecting the strap to a support stanchion, the means being formed at each end of the strap such that each end of the strap is connectable to an associated stanchion, the connecting means maintaining the strap in a flexed state upon the application of a load to the bed, and

(e) a cover snap fitted to the strap locking the tab in the channel and preventing lateral movement thereof.

4,124,156
FEEDBACK ENHANCED WEB FEEDING APPARATUS
William D. Waffner, Grand Island, N.Y., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.
Filed Jun. 22, 1977, Ser. No. 809,010
Int. Cl.[2] B65H *25/22, 17/30*
U.S. Cl. 226—25 **4 Claims**



1. In an apparatus operative on a continuous web, including web infeed and metering means for forwardly feeding and metering said web at a predetermined displacement rate, and

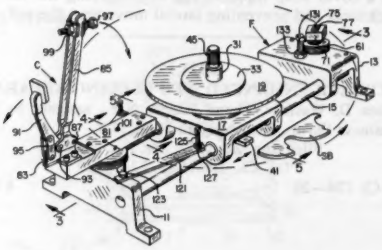
web operational means located posterior to said web infeed and metering means which is capable of effecting a feeding of said web, wherein differential in web tension anterior and posterior to said web operational means can exceed the holding strength and elastic elongation error range desired by said web infeed and metering means, said web infeed and metering means feeding at a first web surface feed rate and at a first web tension level (T_{in}), said web operational means feeding said web at a second web surface feed rate not less than said first web surface feed rate and at any common reference tension level (T_{out}), web snubbing rolls located between said web infeed and metering means and said web operational means for controlling said web at a third roll surface feed rate which is less than said first or said second feed rates and at any said common reference tension level, the web tension thereby increasing incrementally from said web infeed and metering means to said web operational means, said snubbing rolls effecting an isolation of said first web tension at said web infeed and metering means from the web tension present anterior to said web operational means so that desired metering accuracy at said first web tension level at said web infeed and metering means is maintained, the isolation being effected in accordance with the equation $T_{out}/T_{in} = e^{\mu\beta}$, where μ is the apparent coefficient of friction between said web and said snubbing rolls, and β is the total wrap angle of said web about said snubbing rolls, the improvement comprising means for controlling said desired metering accuracy at said first web tension level regardless of a variation of web tension from said common reference tension level, one of said snubbing rolls adjacent said web comprising a hollow perforated roll, and said control means including means for pressurizing the interior of said perforated roll for regulating one of said total wrap angle or the value of said coefficient of friction, whereby as web tension tends to increase above said common reference tension level, said total wrap angle or the value of friction and the tension ratio T_{out}/T_{in} will correspondingly increase.

4,124,157

BRAZING FIXTURE

Robert L. Walker, Vancouver, Wash., assignor to Pacific Saw & Knife Company, Portland, Oreg.

Filed Jun. 13, 1977, Ser. No. 806,052
Int. Cl.² B23D *65/00*
U.S. Cl. 228—49 **6 Claims**



1. A tipping fixture to facilitate the application of tips to circular saw blades, comprising:

an elongate frame having horizontal guides,

a tip support means on one end of said frame having a tip support,

a saw blade supporting table for horizontally supporting a saw blade,

a carriage supporting said table and mounted on said guides for sliding movement therealong to various positions of adjustment to properly locate the teeth of saw blades of various diameters at said tip support,

saw blade centering means including an upright arbor mounted on said carriage and extending vertically through the eye in a saw blade,

means extending through said arbor for releasably clamping said carriage at desired positions along said guides,

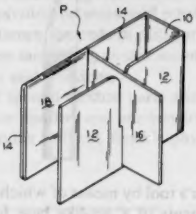
and means for vertically adjusting said tip support to locate a tip properly relative to the midplane of a saw blade.

4,124,158

PARTITION ARRANGEMENT

Robert E. Beck, Chicago, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Jan. 16, 1978, Ser. No. 869,423
Int. Cl.² B65D *5/48*
U.S. Cl. 229—15 **1 Claim**



1. An internal vertical partition structure open at its top and bottom and formed of a unitary blank of foldable paperboard comprising:

(a) a pair of first and second longitudinal panels of substantially similar size spaced from each other in parallel relationship;

(b) an end panel foldably joined at opposite side edges to corresponding end edges of respective longitudinal panels and extending transversely therebetween;

(c) a connecting panel foldably joined at its upper edge to an upper edge of said second longitudinal panel and folded to lie against a portion of the inner surface thereof;

(d) said connecting panel being of the same height as but of substantially less length than said second longitudinal panel;

(e) a transverse panel foldably joined along one side edge to an adjacent inboard side edge of said connecting panel and being disposed to extend normal to said longitudinal panels and beyond said first longitudinal panel;

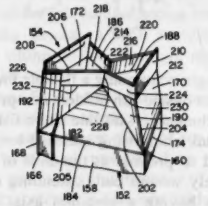
(f) said transverse panel and said first longitudinal panel having complementary slots to provide interlocking engagement therebetween.

4,124,159

CONTAINER CONSTRUCTION

Robert W. Schwarzkopf, Cherry Hill, N.J., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Jan. 3, 1978, Ser. No. 866,720
Int. Cl.² B65D *5/72*
U.S. Cl. 229—17 R **4 Claims**



1. A container of paperboard construction having a coating of thermoplastic material that acts as an adhesive, when heated, to hold the container together, said container comprising, in combination, a tubular body, a top closure for said tubular body, a bottom closure for said tubular body, said

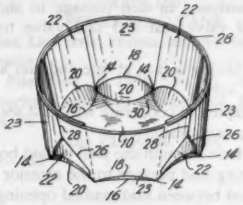
tubular body being defined by first, second, third, and fourth contiguous side walls, each of said side walls having an inner surface and an outer surface, a sealing flap contiguous with said fourth side wall and being sealably secured to the outer surface of said first wall for forming said tubular body, said top closure including a pair of opposed roof panels, a pair of triangular end panels folded inwardly between said roof panels, two pairs of triangular fold-back panels, each pair of said fold-back panels being unitary with respect to one of said roof panels, an outer rib panel connected to each of said roof panels, a pair of inner rib panels connected to each of said fold-back panels, a pouring spout stored in a collapsed condition within said container and being defined by one of said triangular end panels, an adjacent pair of said fold-back panels and said inner rib panels, portions of said roof panels and said outer rib panels, each of said roof panels, said triangular end panels, said triangular fold-back panels, said outer rib panels, and said inner rib panels having an inner surface and an outer surface, and said sealing flap also being adhesively secured to the outer surface of portions of the end panel, fold-back panel and inner rib panel located above said first wall to which said sealing flap is adhesively secured.

4,124,160

ROUND TRAY

George L. Meyers, and Russell R. Webb, both of Menasha, Wis., assignors to American Can Company, Greenwich, Conn.

Filed Jul. 29, 1977, Ser. No. 820,315
Int. Cl.[2] B65D *5/24, 3/04*
U.S. Cl. 229—21 **3 Claims**



1. A blank for a round tray comprising:

a bottom panel whose boundary is defined by a plurality of points of equal radii, R, from the center of said panel and uniformly distributed circumferentially about said center and by a first set of score lines in the form of arcs of circles, having radii r_1, whose centers are positioned outward from said first set of score lines on radii extending from the center of said bottom panel, said score lines of said first set connecting adjacent said points;

a plurality of intermediate panels between said points and equal in number to said points, the boundary of each said intermediate panel being defined on the bottom by one of said first set of score lines and on the top by a score line from a second set of score lines in the form of arcs of circles, having radii r_2, whose centers are positioned inward from said second set of score lines on radii extending from the center of said bottom panel, the score lines of said second set of score lines connecting said adjacent points;

r_1 and r_2 being defined by the following equations

$$r_1 = \frac{R \sin (360°/2n) \left[\tan (360°/4n) \cot \left(\frac{b}{2}\right)\right]^2 + R \sin (360°/2n)}{2 \tan (360°/4n) \cot \left(\frac{b}{2}\right)}$$

and

$r_2 =$

-continued

$$\frac{R \sin (360°/2n) \left[\tan (360°/4n) \cot \left(\frac{a}{b}\right)\right]^2 + R \sin (360°/2n)}{2 \tan (360°/4n) \cot \left(\frac{a}{2}\right)}$$

wherein

n is the number of intermediate panels,

b is the elevation angle of each intermediate panel relative to the bottom panel,

a is the complementary angle of b; and

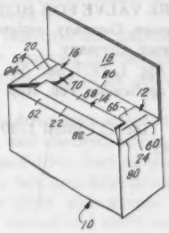
a plurality of wall panels whose boundaries are defined on the bottom by a score line of said second set of score lines.

4,124,161

CARTON CLOSURE WITH SCORED FLAPS

George L. Meyers, Menasha, Wis., assignor to American Can Company, Greenwich, Conn.

Filed Oct. 18, 1977, Ser. No. 843,330
Int. Cl.[2] B65D *5/06*
U.S. Cl. 229—37 R **7 Claims**



1. A carton having four sides and at least one end closure, at least one of said closures having at least one underlying flap and an overlying flap, said underlying flaps being hinged by upwardly biased crease scores to said sides;

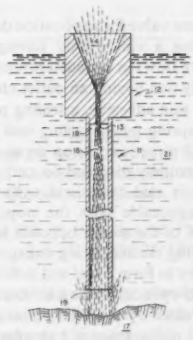
at least one of said underlying flaps having a line of weakness substantially its full length to define sealing margins between said lines of weakness and said crease scores of said underlying flaps, said sealing margins being attachable to said overlying flap.

4,124,162

SHROUD FOR A SUBMERGED JET CUTTING NOZZLE

Thomas L. Schwab, 1369 Windsor Way, Livermore, Calif. 94550

Filed Dec. 15, 1976, Ser. No. 750,678
Int. Cl.[2] E21B *7/18*
U.S. Cl. 239—288.5 **3 Claims**



1. A shroud for the fluid jet nozzle of a fluid cutting drill designed to cut material comprising an elongated tube having

a fluid entrance end adapted to be secured generally hermetically to the drill nozzle circumscribing the fluid discharge orifice thereof, and a fluid discharge end opposite said entrance end for flow through said tube of a material cutting fluid jet emanating from said orifice; the cross-sectional area and shape of the interior of said tube being selected to be spaced for substantially the full length of said tube from such a fluid jet emanating from said orifice whereby flow therethrough of said fluid jet causes a reduction of pressure in said tube to form an expansion chamber, and the length of said tube from said orifice to the discharge end thereof being between about 175 to 300 times the diameter of said orifice.

4,124,163

RELIEF PRESSURE VALVE FOR HOT MELT ADHESIVE

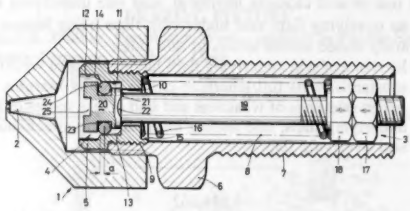
Carl Siegmann, Bremen, Germany, assignor to Firma Heinrich Buhnen KG, Bremen, Germany

Filed Apr. 1, 1977, Ser. No. 783,828

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1976, 7610466[U]

Int. Cl.[2] B05B 1/30

U.S. Cl. 239—533.15 **11 Claims**



1. A relief pressure valve for application devices for hot melt adhesive comprising a valve body having a bore through which said adhesive flows in a predetermined direction, nozzle means on said body and having an outlet channel of predetermined volume for said adhesive, a sealing piston axially movable in said bore, spring means urging said piston opposite to said predetermined direction, a stop on said piston, a sealing element circumferentially disposed on said piston, means providing a cylinder in said bore, said cylinder having means forming a stop engageable with the stop on the piston for limiting movement of the piston opposite said predetermined direction, said sealing element being engageable with the sidewall of said cylinder to form a seal and defining an annular line on said piston, said cylinder having an axial length to its stop forming means greater by a predetermined amount than the axial length of said piston from said annular line to said piston stop such that a volume is defined by said predetermined amount and the diameter of said cylinder which is less than said predetermined volume of said outlet channel.

4,124,164

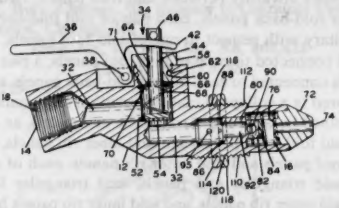
TAMPER PROOF SAFETY CUT-OFF FLUID NOZZLE

Robert C. Bachman, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Jul. 8, 1977, Ser. No. 814,130

Int. Cl.[2] B05B 1/30

U.S. Cl. 239—533.15 **12 Claims**



1. A tamper proof, safety cut-off, fluid nozzle comprising:

(a) a body having a fluid inlet, a fluid outlet, and a fluid passage therebetween,

(b) a means for manually opening and closing said passage between said inlet and said outlet,

(c) an apertured closing means attached to said outlet of said body,

(d) a valve seat on the inner surface of the apertured closing means,

(e) a valve travel limiting means in said passage between said manual opening and closing means and said apertured closing means,

(f) a valve positioned in said passage to slideably move between said valve seat and said valve travel limiting means,

(g) said valve having a face at one end and a passageway through said valve,

(h) said face adapted to cooperate with said seat to close the apertured closing means,

(i) a fluid vent hole through the wall of said body, said vent hole connecting said passage to the exterior of said body and positioned between said manual opening and closing means and said valve travel limiting means to change the pressure of the fluid against the valve in said passage, and

(j) a means for biasing said valve against said valve travel limiting means in an open position against the flow of fluid through said passage until the pressure exerted by the fluid flowing through said passage overcomes the force exerted by said biasing means and moves said valve with the flow of fluid so that said valve face and seat contact one another and close the apertured closing means of said nozzle.

4,124,165

FLUID DISCHARGE DEVICE

Wilbur W. Jarvis, St. Joseph, and Leslie Toth, Coloma, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

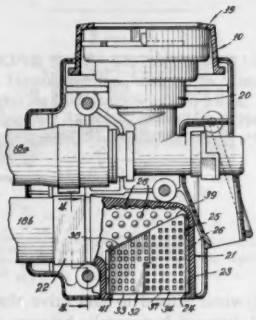
Continuation of Ser. No. 644,917, Dec. 29, 1975, abandoned. This application Dec. 23, 1976, Ser. No. 753,705

Int. Cl.[2] B05B 1/14

U.S. Cl. 239—548 **17 Claims**

1. In a fluid flow discharge duct for discharging a stream of fluid, an improved discharge control device comprising a wall extending transversely across said duct and having a plurality of openings therethrough, said openings being distributed over a major area of the wall, said wall extending longitudinally in the duct with said openings opening transversely to the duct, said wall concurrently dividing the fluid flow through the duct and cooperating with the duct to direct the fluid outwardly

from the duct in a discharge stream, the wall openings being arranged to act on the fluid in the duct to cause a turbulent

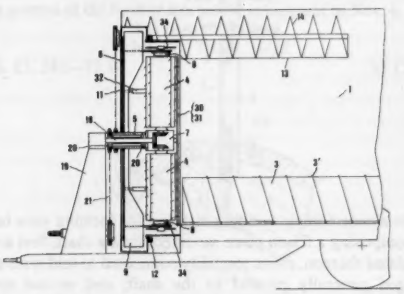


reduction in the longitudinal velocity of the discharging fluid stream.

4,124,166
SPREADING TANK

Gustave Lucas, La Verrie, France, assignor to Lucas G. S.A., La Verrie, France

Filed Dec. 13, 1976, Ser. No. 750,139
Claims priority, application France, Dec. 15, 1975, 75 39604; Mar. 5, 1976, 76 07045
Int. Cl.[2] A01C *23/00*
U.S. Cl. 239—662 **18 Claims**

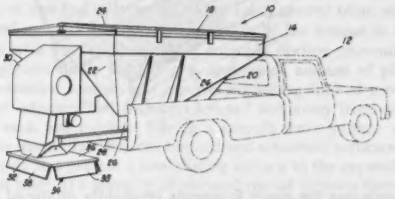


1. A transportable tank for farm use in distributing substances, comprising a frame, a tank mounted on said frame, means within said tank for conveying the substance inside the tank longitudinally from one end to an opposite end of said tank, rotatable shredding means mounted for orbital movement in a frontal plane within said tank adjacent said opposite end, ejection fan means mounted for rotation in a frontal plane on the side of said shredding means remote from said conveying means, recyling means for conveying the substance longitudinally away from said opposite end to said one end of said tank in closed circuit with said tank, and means for selectively connecting said ejection fan means with said recycling means and with the exterior for discharging the substance laterally of the longitudinal axis thereof.

4,124,167
MATERIAL SPREADER FOR MOUNTING ON A VEHICLE

Robert E. Coleman, Box 344, Newton, Kans. 67114

Filed Apr. 11, 1977, Ser. No. 786,065
Int. Cl.[2] E01C *19/20*
U.S. Cl. 239—673 **8 Claims**



1. A material spreader for mounting on a vehicle, the spreader comprising:

a hopper mounted in a hopper housing for storing the material therein, said hopper housing adapted for mounting on the rear of the vehicle;

an endless linked conveyor belt disposed at the bottom of said hopper for receiving the material thereon and discharging it out the rear of an opening in said hopper housing;

an idle drum and a drive drum attached to the sides of said hopper housing, said idle drum mounted at one end of said conveyor belt, said drive drum mounted at the other end of said conveyor belt, said drive drum and said idle drum including drum shafts with annular shaped split drum plates received around said shafts and attached thereto, said split drum plates of said drive drum including teeth extending outwardly therefrom and disposed in a spaced relationship along the length of said drum plates, said teeth engaging said linked conveyor belt and driving said belt thereon;

a material shoot attached to the rear of said hopper housing for receiving the material from the end of said conveyor belt;

a spinner assembly attached to the rear of said hopper housing and vertically disposed in said material shoot for spreading the material;

drive means mounted on said hopper housing for driving said conveyor belt and said spinner assembly; and

clutch means attached to said drive means, said clutch means releasably engaging said conveyor belt and said spinner assembly.

4,124,168
PAPER SORTING METHOD

Alexander Bialski, Loretteville; Camillo Gentile, Mississauga, and Ola Sepall, Quebec, all of Canada, assignors to Reed Ltd., Toronto, Canada

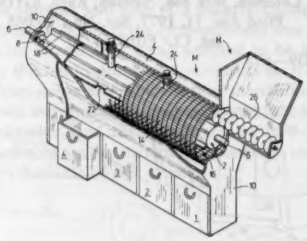
Filed Feb. 7, 1977, Ser. No. 766,144
Int. Cl.[2] B02C *23/16*
U.S. Cl. 241—14 **6 Claims**

1. Method of operating on a dry paper mixture to separate and retrieve at least one of its components from the remainder of the mixture comprising the steps of:

contemporaneously subjecting all components of the mixture to a milling operation;

applying forces to said mixture including scrubbing it against

a surface to procure progressive fragmentation of respective ones of said components, and



retrieving the paper fragments resultantly produced at one stage, at least, of said milling operation.

4,124,169

DOCUMENT SHREDDER

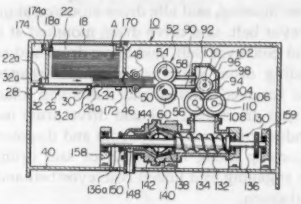
Takefumi Hatanaka, No. 276-19, Higashihiraga Matsudo-shi, Chiba-ken, Japan

Filed Jun. 13, 1977, Ser. No. 806,215

Claims priority, application Japan, May 6, 1977, 52-51250

Int. Cl.[2] B02C *19/00*

U.S. Cl. 241—101.4 **7 Claims**



1. A document shredder for processing wste documents, comprising: means for cutting the waste documents into strips; means for cutting strips of waste documents into chips; a minuting device disposed downstream of said chip cutting means to finely

cut the chips into a pulp-like mass; and means for providing driving power to said strip cutting means, chip cutting means and minuting means.

4,124,170

HORIZONTAL-TYPE SINGLE TOGGLE JAW BREAKER

Ernst Braun, and Gert Braun, both of Essen-Heisingen, Germany, assignors to Halbach & Braun, Germany

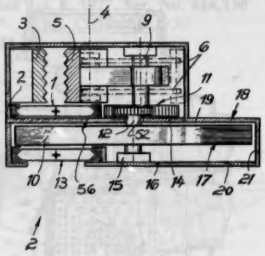
Filed Jul. 11, 1977, Ser. No. 814,837

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1976, 2633798

Int. Cl.[2] B02C *1/04*

U.S. Cl. 241—265 **8 Claims**

1. The horizontal type single-toggle jaw breaker for crushing medium to large sized material such as coal comprising a conveyor having an upper strand on which the material is moved and a lower strand extending below said upper strand, a stationary breaking jaw disposed alongside and extending upwardly over said upper strand in a position to contact material fed thereon, a movable breaking jaw cooperable with said stationary breaking jaw to crush material fed on said conveyor therebetween, said movable breaking jaw having respective first and second opposite ends, pivotal means pivotally mounting said movable braking jaw adjacent its first end for pivotal movement about a substantially vertical axis next to said fixed jaw, a toggle joint having a drive portion connected to said movable braking jaw at a location spaced from said second end, drive means for pivoting said movable braking jaw including a substantially vertical drive shaft, a substantially vertical eccentric shaft connected to said drive shaft and eccentrically moved thereby for pivotally moving said movable breaking



jaw, and a flywheel affixed to said drive shaft for rotation therewith and disposed horizontally between said upper and lower strands.

4,124,171

CONTRACTABLE WINDING MANDREL

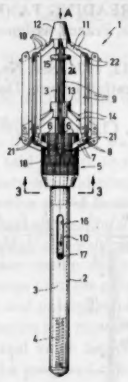
Florian Lucke, Mengen, Fed. Rep. of Germany, assignor to Croon & Lucke Maschinenfabrik GmbH & Co., KG, Mengen, Fed. Rep. of Germany

Filed Sep. 6, 1977, Ser. No. 830,645

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1976, 2643747

Int. Cl.[2] B65H *54/64, 75/24*

U.S. Cl. 242—2 **4 Claims**



1. In a contractable winding mandrel for forming yarn balls and comprising a fix-on piece mounted upon a shaft, first arms articulated thereon, struts rotatably connected to said arms and arranged generally parallel to the shaft, and second arms which are pivotally connected to the struts at their one ends and having their other ends pivotally mounted in a head piece supported on a rod extending axially outwardly of said shaft and which is slidable parallel and coaxially to the shaft, so that when the spacing between the fit-on piece and the head piece is increased or reduced the radial spacing of the struts can be reduced or increased respectively and a ring slidable on said rod pivotally receiving first ends of cross trusses the other ends of which are pivotally connected to the respective struts, the improvement comprising that the outside surface of the fit-on piece is provided with a knurling and at least the second arms are provided with teeth to prevent slipping of yarn upon the mandrel when the spacing between the fit-on piece and the head piece is increased, and a spacer mounted on said rod at a location at which said second arms bear thereagainst when the

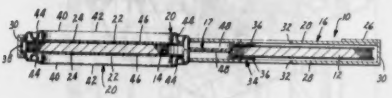
mandrel is contracted, the radial dimension of said spacer being such as to space said struts from said rod and from said ring when said second arms bear against said spacer.

4,124,172

SELF BRAKING PACKAGE FOR STRIP MATERIAL

John T. Verch, Hastings, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 13, 1977, Ser. No. 805,994
Int. Cl.[2] B65D *85/672*; B65H *75/02, 77/00*
U.S. Cl. 242—55.53 **9 Claims**



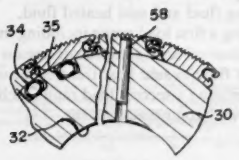
1. A package comprising:
a roll of tape spirally wound about a core;
a housing around said roll including a hub about which said core is rotatably supported and having an opening through which tape from said roll may be withdrawn;
a facing sheet on each side surface of said roll of tape; and
opposed elongate brake members disposed radially of said roll, each brake member comprising a base portion mounted on said housing, a pressure portion adapted to bear against one of said facing sheets and a spring portion between said base portion and said pressure portion having straight parallel sides disposed parallel to and equidistant from a radius for said roll of tape, and arcuate ends joining said sides, said spring portions being adapted to press said pressure portion against said sheets to provide generally a uniform tension in tape being withdrawn from the roll independent of the diameter of the roll.

4,124,173

EXPANDING OUTER SLEEVE FOR A MANDREL OR CHUCK

Lawrence R. Damour, 16 Chesler Sq., Succasunna, N.J. 07876

Filed Jan. 11, 1977, Ser. No. 758,471
The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.
Int. Cl.[2] B65H *75/18*
U.S. Cl. 242—72 B **15 Claims**



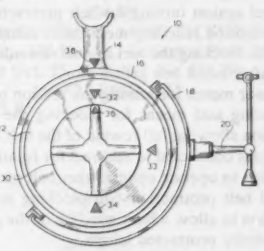
1. A circumferential sleeve assembly which is mounted in and on an expanding mandrel, spool shaft and the like and which provides a core support for said mandrel, and in which the expansion means for the sleeve assembly is at least one resilient tube carried by a body member and in which there is provided means for selectively feeding and releasing air, fluid and the like from said resilient tube, said mandrel and sleeve assembly including: (a) a body member; (b) at least one resilient tube carried in a guide groove formed in said body member; (c) end member means carried by said body member, said end member means providing confining limits for the tubing and also establishing the overall length of the body member; (d) a circumferential sleeve assembly carried by the body member and between the limits established by the confining end members, this sleeve assembly further including; (e) a multiplicity of serially connected leaf members, each leaf member having one longitudinal edge formed as a tongue whose outer portion is enlarged to provide a greater thickness than the portion connecting the tongue to the leaf member, and with the other longitudinal edge of the leaf member formed with a retaining groove whose outer entryway is narrower than the enlarged outer portion of the tongue, said entryway freely passing said connecting portion of the tongue, the resulting assembly of a tongue of one leaf member into a retaining groove of an adjacent leaf member providing a retention of the tongue in the groove with the capturing of the enlarged portion preventing dislodgement while providing a determined amount of play, this assembled tongue in a groove permitting limited movement of adjacent leaf members toward and away from each other, each leaf member having a smooth inner surface and with the inner edge portions blunted and smoothed sufficiently to provide and present a non-chafing surface to the expanding resilient tube; (f) a plurality of circumferential grooves formed in the periphery of the assembled sleeve assembly, said grooves being of a determined depth and width, and (g) a plurality of biased tension members each carried in one of said grooves with the groove depth and width sufficient to receive a said tension member and in the non-expanded condition of the sleeve assembly the tension member is below the outer peripheral surface of the sleeve assembly, said tension member when in mounted condition being slightly stretched so as to draw toward each other the leaf members to which they are secured, the connected leaf members of a sleeve assembly being positioned over the resilient tube so that when said tube is expanded the leaf members are urged outwardly by the expansion of the tube and with an outward diametrical limit being established by the play of the tongue in the groove, and when the pressure in the tube is decreased the stretched tension members draw the leaf members toward and to the body member.

4,124,174

OPEN-FACE SPINNING REEL

James A. Kelly, P.O. Box 1867, Punta Gorda, Fla. 33950

Filed May 16, 1977, Ser. No. 797,072
Int. Cl.[2] A01K *89/00*
U.S. Cl. 242—84.2 R **9 Claims**



1. An indicator system for open-face spinning reels of the type having a reel seat stand supporting a line spool with fishing line thereon of a particular gauge rotatably mounted on a spindle shaft, and a drag nut at the extremity of said shaft for applying a drag force against rotation of said line spool, said indicating system comprising:
a first alignment marker on said reel seat stand;
a plurality of drag setting markers spaced about the periphery of the face of said line spool adjacent said drag nut, each drag setting marker corresponding to a desire drag setting for a predetermined gauge of fishing line on said line spool, one of said drag setting markers representing said particular gauge line on said spool and one of said drag setting markers being preselected for use as an indexing marker during drag setting operations;
a second alignment marker on the face of said drag nut; an indicator chart having multiple indicia thereon, each indi-

cia corresponding to each predetermined gauge of fishing line and further corresponding to the respective one of said drag setting markers; whereby

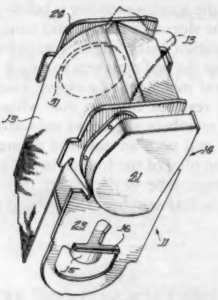
the correct drag setting for line on said line spool may be set by aligning said first alignment marker with said preselected one of said drag setting markers, and by rotating said drag nut to a finger tight position, and then reverse rotation of said drag nut to align said second alignment marker with the correct one of said drag setting markers, as determined by cross reference to said indicator chart.

4,124,175

RETRACTOR WITH TENSION RELIEVING MECHANISM

Raymond S. Cislak, Chicago Heights, Ill., assignor to Gateway Industries, Inc., Chicago, Ill.

Filed Jun. 10, 1977, Ser. No. 805,313
Int. Cl.[2] A62B *35/02*; B65H *75/48*
U.S. Cl. 242—107.7 **12 Claims**



1. In a locking retractor for a seat belt wound upon a rotatable reel urged by a biasing means to wind the belt onto the reel and having a selectively operable locking means for locking the reel against turning for belt protraction, the improvement of a tension relieving mechanism comprising:

means for blocking the reel against rewinding the protracted belt after initial belt protraction,

belt sensor means for sensing the tension of the belt and for operating said means for blocking the reel to a release position allowing full rewind of the belt onto the reel, and

cam means connected to said reel for rotation therewith to a position to operate upon further belt protraction after the initial belt protraction said blocking means to a release position to allow a limit winding of the protracted belt to its initially protracted length.

4,124,176

SELF-TENSIONING REEL

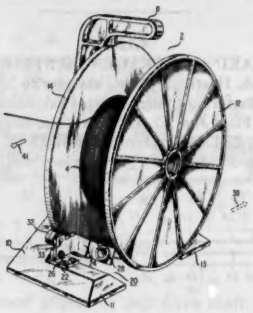
John C. Carlson, Rockaway, and Jeremia P. Starace, Randolph, both of N.J., assignors to Western Electric Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 16, 1977, Ser. No. 861,300
Int. Cl.[2] B65H *59/04*
U.S. Cl. 242—156 **7 Claims**

1. A self-tensioning and self-braking reel for unwinding coiled stock mounted on a reel hub extending between two reel flanges characterized by

a brake for applying a braking force to one of said flanges in response to the relief of unreeling tension on said coiled stock, and

mated threads axially located on said two flanges and adapted to be automatically threaded together to permit lateral compression of said coiled stock when the other of



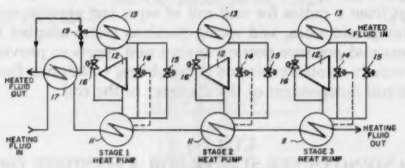
said flanges rotates independently in an unreeling direction in response to said braking force on said one flange.

4,124,177

HEATING SYSTEM

Robert W. Timmerman, 25 Upton St., Boston, Mass. 02118

Filed Apr. 21, 1977, Ser. No. 789,370
Int. Cl.[2] F25B *13/00*
U.S. Cl. 237—2 B **11 Claims**



1. A heating system for receiving a heating fluid and providing heat transfer to a heated fluid, comprising;

at least one heat pump stage receiving said heating fluid and said heated fluid and comprising heat transfer means including compressor means and means for controlling the compressor means,

heat exchanger means coupled to said heat pump receiving said heating fluid and said heated fluid,

means defining a first load range including means for inhibiting operation of said compressor means but permitting refrigerant flow in said heat transfer means,

and means defining a second load range including means for operating said compressor means.

4,124,178

ENERGY AND FUEL CONSERVING UNIT HEATER

Ralph B. Burke, 5400 Gerland Ave., Baltimore, Md. 21206

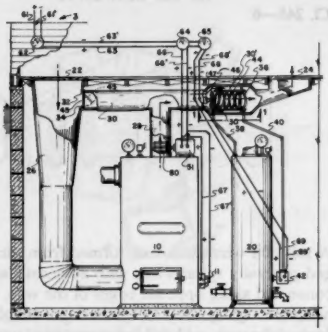
Continuation-in-part of Ser. No. 629,627, Nov. 5, 1975, abandoned. This application Jan. 18, 1977, Ser. No. 760,396
Int. Cl.[2] F24H *6/00*
U.S. Cl. 237—19 **2 Claims**

1. A heating system for a closed building having at least one floor and a space beneath said floor for housing a primary hot air heating unit in the form of a furnace, an air conduit leading from the floor to the bottom of said furnace and means for moving the air through said furnace to an outlet within the floor spaced a substantial distance from the air inlet after the air has reached a predetermined degree by passing through said furnace, the improvement comprising:

a. a second air duct extending substantially in a horizontal plane and adjacent the under side of the floor having one

end connected to the first mentioned air duct leading to the bottom of the furnace and the opposite end leading to a remote air outlet positioned in said building,

b. a one-way air valve positioned at the jointure of the two air ducts allowing the air to pass only into the horizontal air duct and means for connecting the furnace air outlet leading from the top of the furnace to the said horizontal air duct,



c. a hot water heater positioned below the horizontal air duct,

d. a radiator positioned within said horizontal air duct and means for circulating hot water through the said radiator from the hot water heater,

e. a blower for moving part of the air passing through the said horizontal air duct from the furnace through the said radiator for increasing the temperature of the air passing through the horizontal air duct to the air outlet.

4,124,179

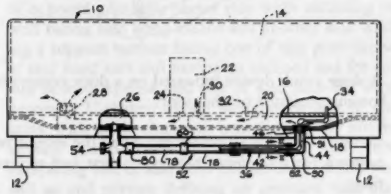
MOBILE HOME ANTIFREEZING SYSTEM

Kim Powell, 8472 King Rd., and Fred S. Sussex, 7923 South Cir., both of Parma, Mich. 49269

Filed Jan. 17, 1977, Ser. No. 760,105

Int. Cl.[2] F24D *5/10*

U.S. Cl. 237—28 **7 Claims**



1. In combination, a mobile home having an internal heating system including a hot air furnace having a pressurized hot air passage and a cold air return passage, a water system serving said mobile home having internal pipes within said home and an external pipe exterior of said home, a thermally insulated conduit system located exteriorly of said mobile home having a first end communicating with one of said passages and a second end communicating with the other passage whereby heated air circulates through said conduit system during operation of said furnace, said external pipe being located within said conduit system for protection from freezing, said external pipe entering said mobile home through said cold air return passage, said conduit system end communicating with said cold air return passage being connected to said return passage at the location said external pipe enters said mobile home.

4,124,180

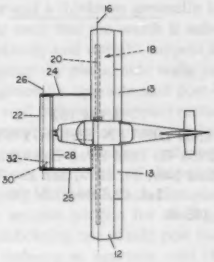
FREE WING ASSEMBLY FOR AN AIRCRAFT

Chester H. Wolowicz, Lancaster, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 8, 1977, Ser. No. 831,634

Int. Cl.[2] B64C *9/10*

U.S. Cl. 244—82 **4 Claims**



1. In combination with an elongated fuselage for an aircraft having a free wing characterized by an effective aerodynamic surface of a constant area and supported for unrestrained pivotal deflection about a spanwise axis forwardly related to the aerodynamic center of the wing, means for establishing a variable angle of attack for said wing comprising:

an airfoil supported for unrestrained pivotal deflection about an axis forwardly related to the aerodynamic center thereof and disposed in spaced parallelism with said spanwise axis, means for varying the lift of the airfoil including a deflectable trim tab connected to the trailing edge of said airfoil, and means for transferring the force of the lift for the airfoil to said wing for varying the pitch thereof including a pair of rigid struts interconnecting said airfoil with said wing.

4,124,181

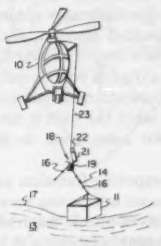
HELICOPTER EXTERNAL LOAD PICKUP SYSTEM

Herman G. Kolwey, 103 Elm Ct., Lexington Park, Md. 20653

Filed Oct. 25, 1977, Ser. No. 845,196

Int. Cl.[2] B64D *1/22*

U.S. Cl. 244—137 R **5 Claims**



1. Apparatus for recovery by a vehicle of objects floating at sea, comprising:

a hook;

a slot disposed at the closed end of said hook;

a float secured to said hook, said float being comprised of styrofoam secured between two bolt connected plates, one of which is welded to said hook;

a hoist line suspended from said vehicle and attached to said hook near its open end opposite said slot; and

a buoyant line attached to said object floating at sea, said line having stops along its length;

whereby when said float, hook, and slot are towed by said hoist line from said vehicle along the surface of the sea at said buoyant line, said slot may securely engage one of said stops along said buoyant line enabling recovery of said object.

4,124,182

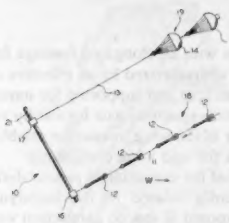
WIND DRIVEN ENERGY SYSTEM

Arnold Loeb, 2956 W. Lunt Ave., Chicago, Ill. 60645

Filed Nov. 14, 1977, Ser. No. 850,949

Int. Cl.[2] B64C *31/06*

U.S. Cl. 244—153 R **27 Claims**



1. A method for using the wind to drive energy conversion means,

said method using wind flown devices, such as parakites, attached through power lines to drums coupled to energy conversion means,

said wind flown devices being arranged in pairs of trains of such devices where one train is being driven outward and the other train is being reeled inward,

said method comprising the steps of:

arming a first of said trains to enable the train to be forced outwardly by the wind and disarming the other train of said pair of trains to reduce the force required to reel the other train in,

disarming the train that is forced outwardly a desired amount and simultaneously arming the train that has been reeled in a desired amount, whereby the train that was reeled in is now forced outwardly and the train that was forced outwardly can now be reeled in with less force, and

retaining the outward most parakite of each of said trains armed even when the train is disarmed.

2. A system for using wind to drive energy conversion means,

said system comprising frameless parakite means,

said parakite means comprising parachute-shaped kite means constructed from pliable material,

said parakite means comprising at least one pair of trains of parakites,

each of said trains comprising a plurality of parakites serially connected,

energy conversion shaft means coupled to drive the energy conversion means,

means for coupling said parakite means to rotate the energy conversion shaft means responsive to wind forces, and

means for arming one of said at least one pair of trains of parakites and disarming the other one of said pair of trains to move reciprocatingly.

4,124,183

ROLL OF WIRE MESH OF THE CHAIN-LINK FENCING TYPE

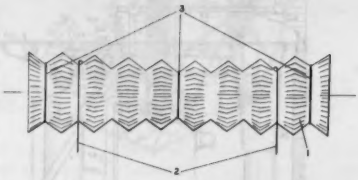
Klaus Herrig, and Heinz Wagner, both of St. Ingbert, Germany, assignors to Acieries Reunies de Burbach-Eich-Dudelange S.A. Arbed, Luxembourg, Luxembourg

Filed Nov. 3, 1977, Ser. No. 848,322

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1976, 26506149

Int. Cl.[2] B21F *29/00*

U.S. Cl. 245—6 **9 Claims**



1. A roll of a wire-mesh web formed from successive inter-engaged generally spiral wires with adjacent flattened spirals interconnected along opposite edges of the web, said roll having the spirals tightly drawn together and sharply bent out of the plane of the web, said roll being provided with at least one and up to three binder strands each binder strand extending between the wire spirals drawn tightly together.

4,124,184

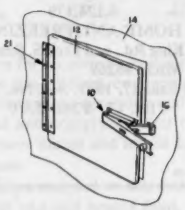
DOOR CATCH

Alfred R. Juergens, Muskegon, Mich., assignor to Fleet Engineers, Inc., Muskegon Heights, Mich.

Filed Jul. 8, 1977, Ser. No. 813,785

Int. Cl.[2] B65D *45/06*; E05C *5/00, 13/02*

U.S. Cl. 248—66 **15 Claims**



1. A door catch device mounted on a door comprising:

a housing mounted on the door;

a lever arm;

mounting means for pivotably mounting the lever arm to the housing for movement between a first and second position;

a shank pivotably mounted to the lever arm at a distance apart from the mounting means mounting the lever arm to the housing;

guide means for guiding the pivotably mounted shank to a first and second position when the lever arm is in a corresponding first and second position;

a keeper mounted adjacent the door for engagement with the shank when in the first position;

biasing means for biasing the shank and lever arm to their respective second positions when the shank and lever arm are in the respective first positions; and

a latch pivotably mounted on the shank for coupling with the lever arm when the shank and lever arm are in their respective first positions and for retaining the shank and lever arm in the first positions; the latch being disengageable from the lever arm when moved to allow the biasing

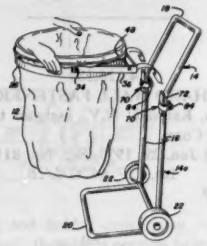
means to move the lever arm and shank to the second position.

4,124,185

BAG HOLDER

Carl M. Preisinger, 691 Bryan, Elmhurst, Ill. 60126

Filed Jun. 29, 1977, Ser. No. 811,200
Int. Cl.[2] A63B *55/08*
U.S. Cl. 248—98 **7 Claims**



1. A wheeled bag holder, comprising:

hoop means having a rim defining an annular shoulder for carrying an open bag;

cord-like means operatively associated with said hoop means for releasably retaining said open bag on said rim;

a generally U-shaped brace having a pair of elongated arms secured to opposite sides of said rim for rigidifying and enhancing the stability of said hoop means and a mounting bar extending between and connected to said elongated arms, the height of said mounting bar being substantially greater than the thickness thereof with said mounting bar having upright sides including an interior side with a generally planar mounting surface;

a hand cart having at least two wheels and a pair of post-like sections;

a pair of removable bracket assemblies, each of said removable bracket assemblies being detachably connected to one of said post-like sections and including an elongated upright support lug having a width generally parallel to said mounting bar and a thickness generally transverse to said mounting bar such that the width is substantially greater than the thickness, said upright support lug having a pair of opposed generally planar side walls including one side wall facing said hoop means and another side wall defining a support surface facing one of said post-like sections of said hand cart and having an inclined end for engaging and bearing against said one of said post-like sections, a generally U-shaped clamp including a pair of clamping arms with each clamping arm having an intermediate arcuate portion for matingly engaging and clampingly embracing one of said post-like sections of said hand cart and an end portion defining an aperture, said clamp including a bight connecting said clamping arms, attachment means for securing said bight to said upright support lug, said attachment means including a fastener having a portion disposed against and between said support surface of said support lug and said one of said post-like sections for spacing said support surface of said support lug from said one of said post-like sections, fastening means insertable in the apertures of said clamping arms for detachably fastening said clamping arms against said one of said post-like sections, and said support surface of said upright support lug and said one of said post-like sections of said hand cart together defining a pocket for receiving said mounting bar so that said U-shaped brace is removably cantilevered from said hand cart with said support surface of said upright support lug engaging and supporting said mounting surface of said mounting bar for substantially preventing said brace from buckling, twisting and bending when said bag is filled.

7. A support assembly adapted to be mounted upon a pair of post-like sections, comprising:

a removable mounting bar extending between said post-like sections;

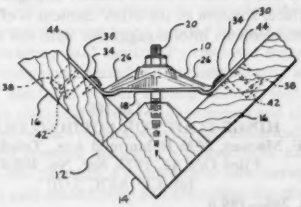
a pair of removable bracket assemblies, each of said removable bracket assemblies being detachably connected to one of said post-like sections and including an elongated upright support lug having a width generally parallel to said mounting bar and a thickness generally transverse to said mounting bar such that the width is substantially greater than the thickness, said upright support lug having a pair of opposed generally planar side walls including one side wall facing generally opposite said post-like sections and another side wall defining a support surface facing toward one of said post-like sections, said lug having an inclined end for engaging and bearing against said one of said post-like sections, a generally U-shaped clamp including a pair of clamping arms with each clamping arm having an intermediate arcuate portion for matingly engaging and clampingly embracing one of said post-like sections and an end portion defining an aperture, said clamp including a bight connecting said clamping arms, attachment means for securing said bight to said upright support lug, said attachment means including a fastener having a portion disposed against and between said support surface of said support lug and said one of said post-like sections for spacing said support surface of said support lug from said one of said post-like sections, fastening means insertable in the apertures of said clamping arms for detachably fastening said clamping arms against said one of said post-like sections, and said support surface of said upright support lug and said one of said post-like sections together defining a pocket for receiving said mounting bar.

4,124,186

FURNITURE ANGLE BRACE AND JOINT FORMED THEREWITH

Gerald A. Call, Sr., Rte. 2, Box 330, Monroe, N.C. 28110

Filed Feb. 10, 1977, Ser. No. 767,513
Int. Cl.[2] F16M *11/16*
U.S. Cl. 248—188 **10 Claims**



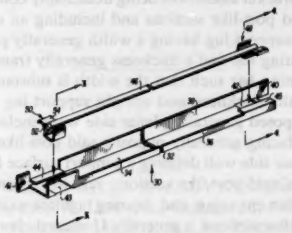
1. A furniture angle brace for securing two side members and a leg in assembled relation, said brace comprising a central bracing portion, a pair of flanges extending angularly from said bracing portion for flatwise engagement of adjacent side members, at least two spaced flat locking tabs projecting generally perpendicularly from each of said flanges for generally perpendicular engagement in the side members by substantially full lateral edgewise engagement in corresponding separate preformed recesses therein to lock the side members in rigid assembled relation, and means for accommodating securement of said flanges to the side members and said bracing portion to a furniture leg.

4,124,187

SUPPORT STRUCTURE FOR A CABINET

William M. Webb, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Mar. 28, 1977, Ser. No. 781,848
Int. Cl.[2] F16M *11/24*
U.S. Cl. 248—188.3 14 Claims



1. A structure for supporting a cabinet on a supporting surface comprising:

(a) a rotatable shaft extending transversely of the cabinet at the rear thereof;

(b) a rotatable leveling element at each end of said shaft, rigidly attached to said shaft, one leveling element extends rearwardly from the shaft and the other leveling element extends forwardly from the shaft;

(c) means for mounting said shaft to the cabinet for rotation about a substantially horizontal axis comprising a channel secured to the cabinet, said channel having a bottom wall and two spaced side walls extending upwardly from the bottom wall disposed therebetween, the channel also includes at each end an inwardly extending flange spaced from the bottom wall, said shaft being disposed at each end between the bottom wall and a corresponding one of the flanges for retaining the shaft in position in the channel; and

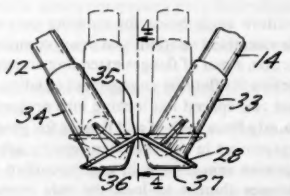
(d) said leveling element being arranged so that rotation of one of said leveling elements, upon engagement with the supporting surface, in a direction to reduce the distance between the underside of said cabinet and the supporting surface, causes corresponding rotation of said shaft and of the other of said elements, said rotation of the other of said elements increasing the distance between the underside of the cabinet and the supporting surface, whereby when only one of said elements initially engages the supporting surface, rotation of the other element is effected to bring both elements into engagement with the supporting surface.

4,124,188

HINGE-FOOT FOR FOLDING FRAME

James F. Machen, 2495 Robinwood Ave., Toledo, Ohio 43620

Filed Oct. 11, 1973, Ser. No. 405,474
Int. Cl.[2] A47C *5/10*
U.S. Cl. 248—188.6 5 Claims



1. In a folding frame of the type described having at least one pair of leg elements, a combination foot and hinge of thermoplastic material comprising:

two sockets each having an open and a closed end;

said sockets attached respectively to said leg elements;

a bridge connecting said sockets at their closed ends at least one wear pad adjacent to one of said sockets;

a self-hingeable portion of reduced thickness in said bridge between said sockets;

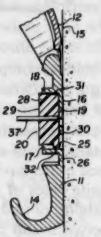
all of said elements forming a single part.

4,124,189

HARD WALL FASTENER

Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.

Filed Jun. 29, 1977, Ser. No. 811,247
Int. Cl.[2] A47G *1/16*
U.S. Cl. 248—489 22 Claims



1. A hard wall fastener comprising:

a fastener body having a flat wall mounting surface, a rear wall adjacent said surface, a recess in said body, a portion of said rear wall forming the bottom of said recess and separating said recess from said wall mounting surface, said recess having at least one side wall and an open front portion;

at least two mounting holes in said rear wall portion, at least one of said holes being elongated to permit rotational movement of said body about mounting elements inserted through said holes;

a first keying element integral with a portion of said body remote from said rear wall and coextensive with a side wall of said recess;

a fastener insert body dimensioned to fit into said recess, said insert having at least two mounting element guide holes which may be aligned with respective ones of said mounting holes when said insert is in said recess, said insert having a front wall surface, at least one side wall, and a rear wall surface which abuts said rear wall of said fastener body when said insert is in said recess, said guide holes extending between the front and rear surfaces of said insert; and

a second keying element integral with said insert adjacent the rear wall thereof and coextensive with said side wall of said insert,

said first and second keying elements engaging each other to prevent rotation of said insert relative to said body only when said insert is partially inserted into said recess, with the rear wall of said insert spaced from the bottom of said recess, and

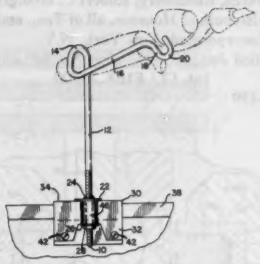
means integral with one of said bodies and adjacent a corresponding one of said keying elements for permitting rotational movement of said insert with respect to said fastener body through a predetermined angle, when said insert is disposed in said recess with the rear wall of the insert abutting the bottom of the recess.

4,124,190

FISHING ROD HOLDER

Herbert O. Wheeler, 447 State St., Hammond, Ind. 46320

Filed Jul. 21, 1977, Ser. No. 817,697
Int. Cl.[2] A01K 97/10
U.S. Cl. 248—538 2 Claims



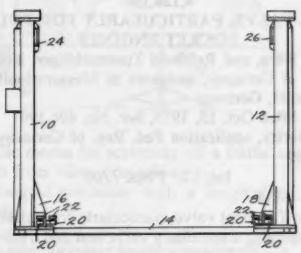
1. In a fishing rod holder comprising in combination an elongated metal rod, the upper portion being turned laterally forming a cradle and at the end formed into a second cradle for supporting a fishing rod, the lower portion being straight and screw threaded with a washer secured to said rod near the upper end of said screw threaded portion, a channel-shaped clamp for application anywhere along the gunwale of a boat, a sleeve fixed to one flange of said clamp through which said threaded rod portion is passed and secured therein by means of a washer and nut, said one flange having a pair of bolts extending through said flange for engaging the inside of said boat, and similar bolts extending through the outer flange to engage the outer surface of said boat to maintain the holder in place on said gunwale.

4,124,191

VEHICLE ELEVATING PLATFORM

Dionys Hofmann, Darmstadt-Marienhöhe, Fed. Rep. of Germany, assignor to Gebr. Hofmann GmbH & Co., Maschinenfabrik, Darmstadt, Fed. Rep. of Germany

Filed Dec. 27, 1977, Ser. No. 864,723
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1977, 2704263
Int. Cl.[2] B66F 7/14
U.S. Cl. 254—89 R 3 Claims



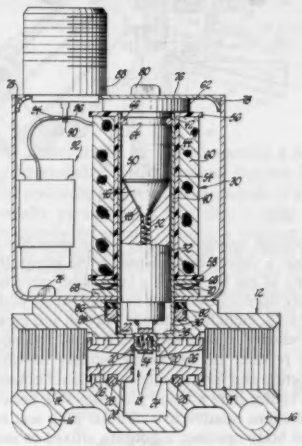
1. A vehicle elevating platform comprising:
a base frame;
two pillars attached to said base frame;
two lift trucks, each respectively slidably attached to one of said pillars for supporting said vehicle;
motivating means within each of said pillars for sliding said lift trucks along said pillars;
means for synchronizing the movement of said lift trucks, said synchronizing means located within said base frame;
two three-phase AC motors, each respectively attached to one of said pillars, connected to said motivating means;
a power supply connected to said motors; and
switch means for disconnecting one of said motors from said power supply when the torque necessary to lift said vehicle is capable of being developed in the other of said motors.

4,124,192

TIME DELAY SOLENOID OPERATED VALVE

Thomas G. White, Troy, Mich., assignor to Ambac Industries Incorporated, Troy, Mich.

Filed Feb. 28, 1977, Ser. No. 772,348
Int. Cl.[2] F16K 31/06
U.S. Cl. 251—129 18 Claims



1. A valve assembly comprising; a valve housing defining an inlet passage and an outlet passage in communication therewith, valve means movable between an open position for allowing fluid flow through said passages and a closed position for preventing fluid flow through said passages, electrically operated means for moving said valve means from one of said positions to the other position upon the actuation thereof resulting from electrical power being applied thereto, and circuit means for maintaining said electrically operated means actuated for a predetermined period of time immediately after the termination of electrical power applied thereto, said circuit means including electrical energy storage means and electrical current resistance means in parallel with said electrically operated means, said housing including a counterbore extending transversely to said passages, a nonmagnetic tube having a first end disposed in said counterbore and extending therefrom to a second end, said plunger being slidably disposed in said tube, a plunger seat disposed in said second end of said tube for engaging and limiting movement of said plunger in said open position, biasing means reacting between said plunger and said plunger seat, said electrically operated means including a plastic bobbin with end flanges extending from the ends thereof and surrounding said tube and a coil disposed thereabout, said plunger seat includes a head engaging said second end of said tube and one of said end flanges of said bobbin, resilient means reacting against the end flange at the other end of said bobbin for urging said bobbin against said head of said plunger seat, a casing disposed on said housing and surrounding said solenoid, said casing including a cover engaging said head of said plunger seat, said plunger seat being secured to said tube.

4,124,193

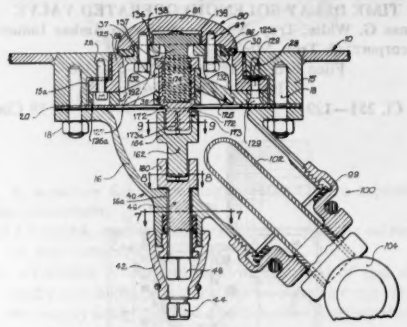
BOTTOM OPERABLE TANK CAR VALVE ASSEMBLY HAVING SHEAR PLANE

Charles E. Reedy, Bridgeton, and Edwin S. Carlson, St. Charles, both of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 700,106, Jan. 28, 1976, abandoned, which is a division of Ser. No. 513,082, Oct. 8, 1974, Pat. No. 3,981,481. This application Jun. 8, 1977, Ser. No. 804,664

Int. Cl.[2] F16K *1/48*

U.S. Cl. 251—144 **20 Claims**



1. A bottom operable lading valve assembly for tank cars comprising: a valve body adapted to be integrally attached to an opening in the bottom of a tank; said valve body having a valve body opening therein; a retainer fitting within said valve body opening, including a flange portion and means for attaching said retainer to said valve body, said retainer including at least one retainer rib extending radially inwardly from said flange portion and terminating in a retainer connection portion having a center hub; a valve plug movable between open and closed positions relative to a circular plug seat located within said valve body opening, a housing affixed to said valve body with fastening means comprising a shear plane; said housing having a generally vertical housing opening therein into which a rotatable valve operator is mounted comprising a lower tool connection portion and an upper operating portion; said center hub slidingly engaging said upper operating portion to allow rotation of said upper operating portion while maintaining said upper operating portion spaced from said valve body and vertically fixed; said upper operating portion having upper operator threads for engaging a valve plug operating stem depending from said valve plug having stem threads which engage said upper operator threads; said valve operator including separating means for separating a portion of said valve operator on or below said shear plane in the event said housing should shear off along said shear plane; said valve plug having at least one plug depending member in addition to said stem extending downwardly sufficiently far to engage said rib when said plug is in open and closed positions, whereby during rotation of said valve operator in a first direction to move said plug from closed to open position, said depending member assumes an engaged position with said rib, which prevents rotation of said plug; and whereby rotation of said valve operator in said first direction causes said plug to move vertically toward open position without rotation; closure plug stop means which engage when said plug assumes the full open position; and whereby rotation of said valve operator in open position in a second direction, opposite to said first direction, causes said plug to engage one of said ribs, and whereby rotation of said valve operator causes said plug to move vertically downwardly to a closed and seated position without rotation; and whereby when said closure plug is in closed position severe impacts to said outlet will cause said housing and a portion of said valve operator to separate from said outlet on or below said shear plane, thereby tending to maintain said valve plug in the closed, seated position and maintain any lading within the tank during and after such impact.

4,124,194

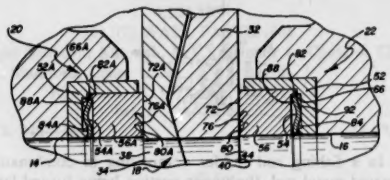
METALLIC SEAT CONSTRUCTION FOR VALVES

Patricio D. Alvarez, Rosenberg; Robert C. Houlgrave, and Manmohan S. Kalsi, both of Houston, all of Tex., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Jun. 20, 1977, Ser. No. 807,852

Int. Cl.[2] F16K *25/00*

U.S. Cl. 251—159 **9 Claims**



1. A metallic seat assembly for a gate valve having a valve body with inlet and outlet passageways communicating with a valve chamber and a gate valve member mounted in said valve chamber movable between open and closed positions, said seat assembly comprising:

(a) an annular seat pocket around one of said passageways and opening to said valve chamber;

(b) an annular seat member mounted in said seat pocket and having a front face sealingly engagable with said valve member;

(c) an annular groove in said seat member around a mid-portion of said front face such that a portion of said front face lies radially inside said groove and another portion of said front face lies radially outside of said groove; and

(d) a lip integral with said seat member and extending from the closed end of said groove through said groove with the unattached end of said lip extending beyond said seat front face when said lip is in a free position, said lip normally resting in sealing contact with said valve member and said lip being deflectable completely into said groove such that said seat front face can engage said gate valve member in flush surface contact.

4,124,195

CONTROL VALVE, PARTICULARLY FOR PULSATING ROCKET ENGINES

Karl Braun, Bürg, and Reinhold Tussetschläger, Kochersteinsfeld, both of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Germany

Filed Oct. 15, 1973, Ser. No. 406,190

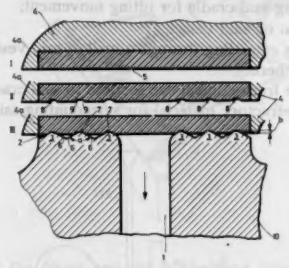
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1972, 2253059

Int. Cl.[2] F16K *1/00*

U.S. Cl. 251—333 **4 Claims**

1. A shut-off control valve, particularly for pulsating rocket engines, comprising a stationary valve seat and a moving valve part having facing surfaces interengageable responsive to movement of said valve part in a valve-closing direction, the facing surface of one of said valve seat and said moving valve part having a plurality of concentrically arranged annular sawtooth-shaped sealing ridges with relatively narrow flat sealing crests extending perpendicularly to the valve-closing direction, and having oblique planar striking flanks on each side of said crests, made of a strong material such as steel, the facing surface of the other one of said valve seat and said moving valve part being made of a relatively soft elastic synthetic resin material that, above a predetermined pressure load thereon, is irreversibly deformable, and having a continuous initially plane smooth facing surface before the first closing

operation of the valve, but being irreversibly deformed, to form a facing surface which is complementary to the other facing surface, having said sealing ridges, responsive to a pressure load thereon, exceeding said predetermined pressure lead, upon initial closing of the valve, by interengagement of said



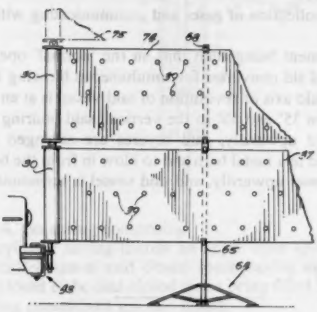
facing surfaces; the included angle between said striking flanks having a value such that, upon subsequent closing operation of the valve, said elastic synthetic resin material can flow into the spaces between said annular sealing ridges without exceeding its irreversible deformation yield point, to form an elastic buffer.

4,124,196

PORTABLE DEVICE FOR SCREENING OFF AN ACCIDENT SCENE FROM VIEW

Myron M. Hipskind, 2 Oak Brook Club Dr. Res. C 101, Oak Brook, Ill. 60521

Filed Mar. 10, 1977, Ser. No. 776,441
Int. Cl.[2] E04H *17/00*
U.S. Cl. 256—1 **6 Claims**



1. Portable means for screening off a traffic accident scene and the like from view, comprising —

a. an elongate container with a longitudinal slot therethrough,

b. a spring-actuated curtain rod assembly rotatably mounted within said container lengthwise thereof,

c. a substantially rectangular non-transparent sheet of thin flexible material having one end thereof secured to said curtain rod and extending outwardly through said slot,

d. thickening means at the other end of said sheet to prevent it from passing into the container through said slot,

e. connecting means at said other end of the sheet for releasably securing the same to a stationary object, and

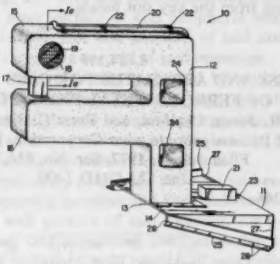
f. adjustable clamping means attached to said container for non-rotatably securing the same in a vertical position to a stationary object, such as the bumper of a parked vehicle, whereby said container may be routinely carried by an emergency vehicle and rapidly erected at the accident scene with the screening sheet extended in a substantially vertical position to shut off the scene from view.

4,124,197

SAFETY TRAFFIC BARRIER

Andrew God, Jr., 9214 Kilmarnock Dr., Fairfax, Va. 22030

Filed Dec. 7, 1977, Ser. No. 858,205
Int. Cl.[2] E01F *9/01*
U.S. Cl. 256—13.1 **10 Claims**



1. A portable safety traffic barrier comprising a relatively heavy base, a substantially vertical hollow column of a thin flexible material upstanding from said base, a pair of vertically spaced substantially parallel arms of a thin flexible material extending horizontally from said column, a resilient medium filling each of said column and horizontal arms such that said column and arms will return to their vertical and horizontal positions after any impact thereto, means interconnecting the free ends of said horizontal arms, a light on one of said horizontal arms, a source of electrical energy mounted on said base and having electrical leads extending therefrom to connect to said light, and means on said vertical column and said one horizontal arm for securing the said electrical leads thereto.

4,124,198

PLASTIC FENCE

Woon-Tong Wong, 14 Upton St., Boston, Mass. 02118

Filed Oct. 3, 1977, Ser. No. 838,626
Int. Cl.[2] E04H *17/16*
U.S. Cl. 256—24 **12 Claims**

1. A plastic fence comprising;

a plurality of like-diamter post sections each having means for interconnecting the post sections linearly in vertical array, in at least two parallel arranged groups with one secton of each group for anchoring the group in the ground,

and means supported between the post section groups including key means extending toward each group,

said post sections each having key slot means spacedly disposed therealong in at least two diametrically disposed sets for receiving the key means,

said means for interconnecting comprising mating thread means of adjacent post sections including a female portion of one section and a reduced-diameter male portion of the other section,

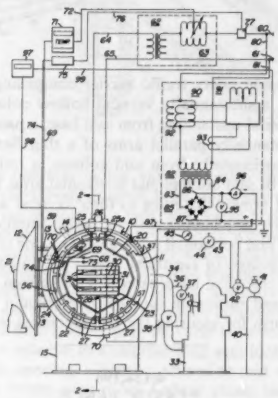
at least one of said key slot means of said one section being sufficiently proximate said female portion so that said male portion at least partially blocks the key slot means to prevent the key means associated therewith from disengaging from the key slot means.

4,124,199

PROCESS AND APPARATUS FOR CASE HARDENING OF FERROUS METAL WORK PIECES

William R. Jones, Chalfont, and Prem C. Jindal, Feasterville, both of Pa., assignors to Abar Corporation, Feasterville, Pa.

Filed Jul. 11, 1977, Ser. No. 814,221
Int. Cl.[2] C21D *1/00*
U.S. Cl. 266—88 **12 Claims**



1. Apparatus for forming a case on a ferrous object which comprises

a vacuum chamber having an enclosing wall and a plurality of electric resistance heating elements therein spaced inwardly from said wall and surrounding a work space,

means for supplying an ionizable gas into said chamber,

means for applying an electrical potential between a work piece supported interiorly of said heating elements and said chamber for ionizing of the gas and heating of the work piece, and

means comprising said resistance heating elements supplying heat to the interior of said chamber for heating the work piece in predetermined relation to the application of said electrical potential.

4,124,200

CONVERTER FOR REFINING LIQUID METALS, WITH HEATING AND BLOWING IN MEANS

Lucien Antoine, Fraisses; André Maubon, Saint-Etienne, and Gérard Largeron, Saint-Germain-le-Puy, all of France, assignors to Creusot-Loire Enterprises, Courbevoie-La-Defense and Clesid S.A., Saint Chamond, both of, France

Filed Jun. 29, 1977, Ser. No. 811,675
Claims priority, application France, Jul. 9, 1976, 76 21111
Int. Cl.[2] C21C *5/40*
U.S. Cl. 266—158 **8 Claims**

1. A converter for refining a liquid metal using simultaneous blowing in and heating, the converter comprising:

a metal vessel for receiving a liquid metal bath, internally lined with refractory material and having an upwardly open mouth, said vessel having a generally cylindro-frustoconical shape and being a body of revolution about an axis;

a cradle;

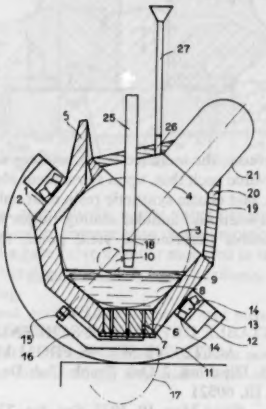
means mounting said vessel in said cradle for rotation relative thereto about said axis of revolution;

means mounting said cradle for tilting movement;

a pouring spout on said vessel;

a set of tuyeres extending through a wall of said vessel into the interior thereof;

a non-rotatable frustoconical cap secured to said cradle and lined with refractory material for surmounting said open



mouth of said vessel, said cap being separate from said vessel, and defining an opening for receiving heating means; and

a hood for collection of gases and communicating with said cap;

the arrangement being such that, in the 'normal' operative position of sid converter for simultaneous blowing in and heating, said axis of revolution of said vessel is at an angle of between 35° and 55° to the vertical, said pouring spout is directed upwardly, said tuyeres are arranged to be submerged in a metal bath and to blow in from the bottom of said vessel upwardly, and said vessel is surmounted by said cap.

4,124,201

KNOCKDOWN SPRING UNIT

Robert E. Burton, 2605 W. Strawberry La., Santa Ana, Calif. 92706

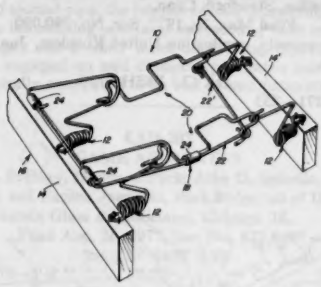
Filed Sep. 1, 1977, Ser. No. 829,949
Int. Cl.[2] F16F *3/00*
U.S. Cl. 267—99 **18 Claims**

1. A knockdown spring unit, comprising, in combination:

(a) a lift spring connectible to a rail of a furniture frame; and

(b) platform means releasably connected to the lift spring for forming a seating surface of the frame, the lift spring including a coil portion having two ends respectively terminating in an eye disposed adjacent the coil portion and a stem, the stem being disposed extending across and transversely away from the coil portion, the stem having

a bend provided in the extent thereof, and the stem terminating in a hook with the eye being attachable to the rail



of the frame and the hook being engageable with the platform means.

4,124,202

GAS SPRING

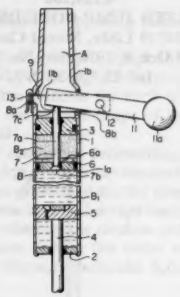
Susumu Hatakeyama, Yokohama, Japan, assignor to Tokico Ltd., Kanagawa, Japan

Filed May 23, 1977, Ser. No. 799,313

Claims priority, application Japan, May 28, 1976, 51-68738[U]

Int. Cl.[2] F16F 9/32

U.S. Cl. 267—118 **1 Claim**



1. A gas spring comprising:

a cylinder having therein an upper open space and a lower closed space, said closed space having upper and lower closed ends, said closed space being filled by fluid including pressurized gas and liquid;

a piston slidably positioned in said closed space of said cylinder;

a portion rod connected to said piston and extending out of said closed space through said lower closed end;

valve means, positioned in said closed space, for controlling movement of said fluid within said closed space in response to movement of said piston in said closed space, and thereby controlling the volume of said pressurized gas in said closed space;

actuating element means, slidably extending through said upper closed end of said closed space into said open space, for actuating said valve;

said cylinder including a peripheral wall portion defining said upper open space, said peripheral wall portion having therethrough diametrically opposed openings;

a supporting member formed of a plate-like member bent into a substantially U-shaped configuration including a pair of spaced parallel arms and an end portion connecting said arms, a part of said end portion and parts of said arm adjacent said end portion being removed to form a step defined by first abutting surfaces extending substantially parallel to said arms and second abutting surfaces extending substantially transverse to said arms;

said supporting member being positioned to extend through said opposed openings in said peripheral wall portion of said cylinder, such that said arms extend in substantially vertical planes, such that said end portion of said supporting member extends through a first of said openings, with said first abutting surfaces contacting an edge of said peripheral wall portion which defines the bottom of said first opening, and with said second abutting surfaces contacting the inner surface of said peripheral wall portion, and such that the free end portions of said arms extend outwardly through a second of said openings;

an operating lever pivotally supported by said arms at a position exterior of said cylinder, said operating lever extending through said second opening into said open space, with an end of said operating lever being positioned above said actuating element means; and

clip means, removably positioned between said end portion of said supporting member and the outer surface of said peripheral wall portion of said cylinder, for positioning and retaining said supporting member within said openings of said peripheral wall portion of said cylinder.

4,124,203

APPARATUS FOR FORMING SHEET MATERIAL ASSEMBLAGES

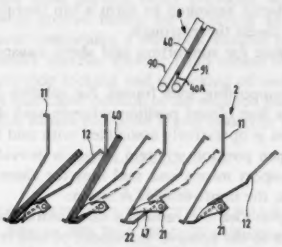
Hans Müller, Zofingen, Switzerland, assignor to GRAPHA-Holding AG., Switzerland

Filed Feb. 1, 1977, Ser. No. 764,638

Claims priority, application Switzerland, Feb. 19, 1976, 2024/76

Int. Cl.[2] B65H 5/30

U.S. Cl. 270—55 **11 Claims**



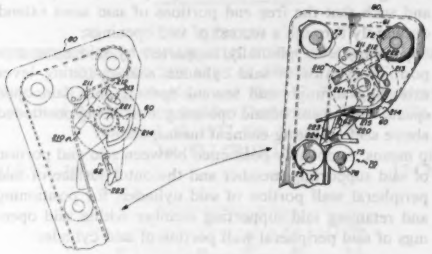
1. In an apparatus for collating and otherwise manipulating sheet material articles, particularly in a newspaper stuffing apparatus, a combination comprising a plurality of pockets each having a first wall and a second wall; means for transporting said pockets in a predetermined direction along a predetermined path; at least one stuffer adjacent said path and having a first device for feeding first sheet material articles between the first and second walls of successive pockets during travel of such pockets along a first portion of said path and at least one second device for feeding second sheet material articles between the first and second walls of successive pockets during travel of such pockets along a second portion of said path; braking means associated with each of said pockets, each of said braking means including at least one braking member having means for frictionally engaging and gradually decelerating article while it is being fed into the respective pocket during transport of such pocket past said first feeding device; and means for reducing frictional engagement between said braking members and the first articles in the respective pockets during travel of said braking members along said second portion of said path.

4,124,204

SORTING APPARATUS AND REPRODUCING MACHINE

Warren T. VanBuskirk, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 4, 1977, Ser. No. 784,294
Int. Cl.[2] B65H *29/58, 29/16*
U.S. Cl. 271—173 15 Claims



1. In a sorting apparatus for collating the output of a reproducing machine, said apparatus comprising:

a plurality of sheet receiving bins;

a first frame for supporting said sheet receiving bins;

sheet transport means for transporting said sheets to said bins including at least one transport member and at least one belt under a desired tension, said transport member and said belt being arranged to form a nip therebetween to transport sheets therethrough;

a second frame for supporting said sheet transport means; and

means for supporting said frames for relative movement between a first closed position wherein said sheet transport means is operatively associated with said bins, and a second open position wherein access is provided to said sheet transport means and said bins for sheet clearance therefrom; the improvement wherein:

means are provided for reducing said desired belt tension responsive to the relative movement of said frames from said first closed position to said second open position;

whereby clearance of said sheets from said sheet transport means is facilitated by the reduction in the tension of said at least one belt.

10. In a sorting apparatus for collating the output of a reproducing machine, said apparatus comprising:

a plurality of sheet receiving bins;

a first frame for supporting said sheet receiving bins;

sheet transport means for transporting said sheets to said bins;

a second frame for supporting said sheet transport means and

means for supporting said second frame for movement between a first closed position wherein said sheet transport means is operatively associated with said bins and a second open position to provide access to said sheet transport means and said bins for sheet clearance therefrom; the improvement wherein:

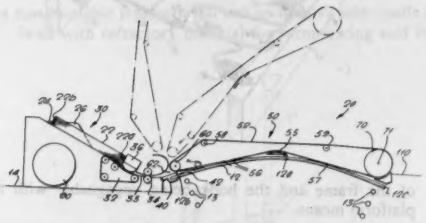
means are provided for counterbalancing said second frame as it is moved from said first position to said second position, said counterbalancing means comprising at least one leaf spring mounted in cantilever fashion on said first frame and said second frame including at least one rotatably supported member for engaging said leaf spring.

4,124,205

DOCUMENT HANDLING

Roy G. H. Barton, Cinderford, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 24, 1977, Ser. No. 780,890
Claims priority, application United Kingdom, Jun. 25, 1976, 26583/76
Int. Cl.[2] B65H *9/10*
U.S. Cl. 271—233 6 Claims



1. A photocopier including a platen for receiving documents carrying information to be copied and an inwardly tapered registration edge against which an edge of a document may be positioned, said registration edge being formed by a generally channel-shaped member of resilient material extending along an edge of the platen and fitted over the platen edge with the sides thereof gripping the opposite faces of the platen.

4,124,206

WATER JUMP ROPE DEVICE

Donald C. Price, 34539 Libke, Mount Clemens, Mich. 48043

Filed Oct. 8, 1976, Ser. No. 731,084
Int. Cl.[2] A63B *5/22*
U.S. Cl. 272—74 2 Claims

1. Improvement in a water powered jump rope device having a pair of standards and a hollow water-conducting jump rope rotatably supported by and between said standards, said improvement comprising each said standard being free standing and consisting of a hollow base and a water-conducting upright pipe supported on said base, said base having a threaded fill opening for receiving a ballast, the lower end of said upright pipe threadably engaged in said fill opening, said standard having liquid inlet means therefor, a water-conducting swivel joint carried on a side of said upright pipe near the upper end thereof, said swivel joint comprising a threaded boss formed in a side of said upright pipe, a threaded hollow gland threadably engaged in said boss, a second water-conducting pipe, said second pipe rotatably carried in the interior of said gland, a flange on the inner end of said second pipe, a radial surface on the inner end of said gland which serves as a bearing

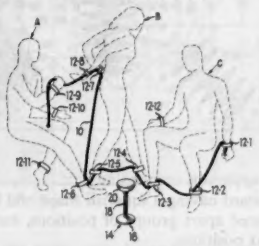
surface for said flange during rotation of said second pipe, said radial surface and said flange forming a water-tight rotating seal for said swivel joint during operation of said device, a water-conducting connecting member engaged on the outer end of said second pipe, the interior of said connecting member formed by intersecting apertures intersecting each other at an obtuse angle, and a third water-conducting pipe having its inner end engaged on said connecting member and its outer end frictionally connected to an end of said jump rope.

4,124,207

GAME APPARATUS

Jeffrey D. Breslow, Highland Park; John O. Spinello, Glendale Heights, and Eugene Jaworski, Park Ridge, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Aug. 26, 1977, Ser. No. 827,949
Int. Cl.[2] A63F 9/00
U.S. Cl. 273—1 R 10 Claims



1. A game apparatus for opposing teams of two or more players comprising:

a plurality of adjustable flexible straps adapted to be looped around the arms and/or legs of the players of each team,

an elongated flexible element for each team adapted to be passed through the looped straps of the players in a selected order; and

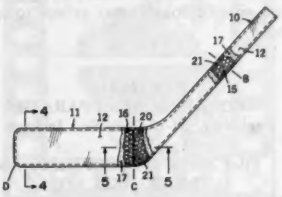
chance means for randomly determining the order that a leading end portion of a flexible element is passed through the looped straps positioned on the players of each team; said chance means and said straps having corresponding indicia thereon whereby the random order determined by said chance means directs the order of passage of said flexible element through particular looped straps on said players.

4,124,208

HOCKEY STICK CONSTRUCTION

Charles E. Burns, Winchester, Tenn., assignor to Numerical Control, Inc., St. Louis, Mo.

Filed May 9, 1977, Ser. No. 795,094
Int. Cl.[2] A63B 59/14
U.S. Cl. 273—67 A 3 Claims



1. A hockey stick, comprising:

(a) front and back metal outer skins of continuous one piece including an elongate handle portion and an integral blade portion,

(b) metal honeycomb sandwiched between the metal outer skins along the handle and blade portions, the metal honeycomb including:

(1) a first honeycomb portion between the outer metal skins along the handle portion, the first honeycomb portion tapering in thickness at the neck of the handle portion and extending to the blade portion, and

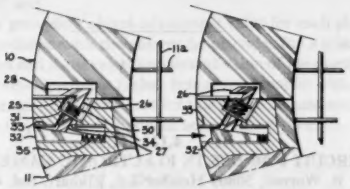
(2) a second honeycomb portion, thinner than the first honeycomb portion, between the outer metal skins along the blade portion and extending to the handle portion, the tapered first honeycomb portion and the thin second honeycomb portion having substantially the same thin thickness at a juncture for flexibility of the blade portion and neck of the handle portion.

4,124,209

TENNIS RACQUET WITH INSERT

Philip F. DiLeo, P.O. Box 388, Boulder, Colo. 80302

Continuation-in-part of Ser. No. 626,510, Oct. 28, 1975, which is a continuation-in-part of Ser. No. 567,922, Apr. 14, 1975, abandoned. This application May 13, 1976, Ser. No. 678,733
Int. Cl.[2] A63B 49/02
U.S. Cl. 273—73 L 2 Claims



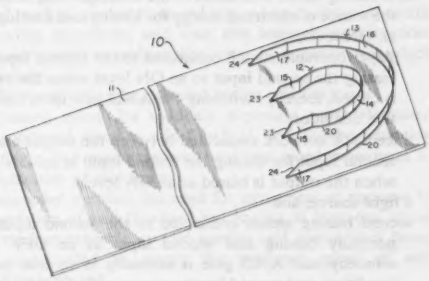
1. A racquet having a replaceable playing surface, said racquet including a frame member having a handle and a head portion, said head portion being provided with an arcuate opening with groove means for receiving an insert, and a racquet insert comprising a rim with suitable playing surface secured fixedly therein, locking latch means acting with lug means to provide locking and unlocking of said insert within the head of said frame portion of the racquet, and wherein said locking latch means comprise hooks biased in a locked position.

4,124,210

GOLF PUTTING PRACTICE APPARATUS

Herbert B. Mason, 456 Park Blvd., Worthington, Ohio 43085

Filed Jul. 25, 1977, Ser. No. 818,565
Int. Cl.[2] A63B 69/36
U.S. Cl. 273—176 F 16 Claims



1. A golf-putting practice device comprising

an elongated sheet of flexible material having an upper surface adapted to rolling of golf ball thereover when said

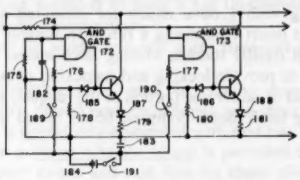
sheet is positioned on a suitable floor in a substantially horizontal plane, said sheet having formed in one marginal end portion thereof an elongated slot of arcuate configuration with the ends of said slot spaced a predetermined distance apart, said slot being of a configuration defining a substantially closed loop which opens in the direction of the opposite end of said elongated sheet, and an elongated retaining wall formed from a flexible material selectively and removably positionable in said slot in assembled relationship with said elongated sheet, for maintaining said wall in the configuration of said slot and having an opening to permit passage of a golf ball therethrough when assembled with said sheet, said retaining wall being formed with an upstanding wall member and support means provided at a bottom edge of said upstanding wall member for cooperatively interengaging with said sheet for maintaining said wall member in upstanding relationship to a floor, said upstanding wall member being of a height to extend a sufficient distance above said sheet to stop a golf ball rolling on said sheet.

4,124,211

CIRCUIT FOR USE IN ELECTRONIC GAME OF NIM

Roy R. Worrall, 50809 Heather La., Elkhart, Ind. 46514

Filed Aug. 26, 1977, Ser. No. 827,984
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—237 **5 Claims**



1. A circuit for use in an electronic game of nim, said circuit comprising

a source of electrical energy;

an AND gate having a first input, a second input and an output;

first biasing means connected to the first input and including the source of electrical energy for biasing said first input at an ON level;

a player operable switch connected to the second input for biasing the second input to an ON level when the switch is closed, thereby switching the AND gate to its conductive condition;

a feedback network connected between the output and the second input for biasing the second input at an ON level when the output is biased at an ON level;

a light source; and

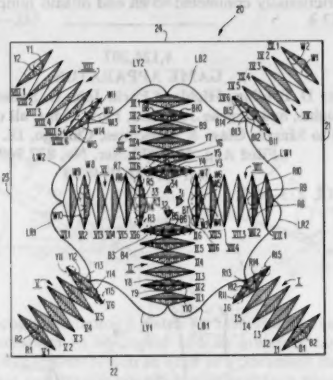
second biasing means connected to the second input, for normally biasing said second input at an OFF level whereby said AND gate is normally in its low output condition, said second biasing means including the source of electrical energy, and switching means connected between the light source and the AND gate, said switching means energizing said light source when said AND gate is in its high output condition.

4,124,212

GAME APPARATUS FOR BACKGAMMON FOR FOUR PLAYERS

Martin Normart, 36 Garfield Ave., Norwood, Pa. 19074

Filed Feb. 23, 1977, Ser. No. 771,249
Int. Cl.[2] A63F *3/02*
U.S. Cl. 273—248 **1 Claim**



1. A game apparatus comprising:

a. a game board having a squarish shape and having at least eight spaced apart groups of positions, each group containing six positions;

b. said game board having at least four sides, each side comprising a playing location for a player, one group of said positions being arranged in each of the four corners of the board and four groups of said positions being arranged in the approximate center of the board;

c. a set of pieces for each player, each set having a respective color;

d. paths on the board indicating movement of the pieces of each player through successive playing positions in a direction which is opposed to the direction of movement of the pieces of the other three players, said paths including lines indicating paths of movement which connect each group of positions arranged at each respective corner of the board with the two nearest groups of positions arranged in the center of the board;

e. said positions being quadrilateral in shape, and wherein within each group the positions have colors limited to the colors of the pieces which may move within such group, so as to indicate path of movement for the pieces of each player; and

f. wherein a first group of positions is to the left of each player's playing location, and a respective last group of positions is to the right of each such playing location, and wherein indicator paths comprising said lines and said position colors within each group are provided to indicate the path of movement for each player from each respective first group through other groups to each respective last group.

4,124,213

BOARD GAME APPARATUS

Arthur R. Kaplowitz, 34-18 76th St., Jackson Heights, N.Y. 11372

Filed Jun. 8, 1977, Ser. No. 804,640
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—248 **25 Claims**

1. A game apparatus comprising

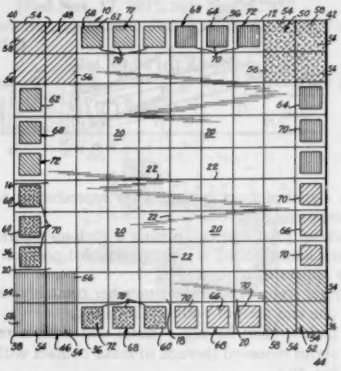
distinguishable sets of playing pieces with each player of the game receiving one of said sets,

a game board having a playing surface upon which said playing pieces are supportable,

said playing surface having a plurality of columns extending longitudinally of said board and each containing a plurality of spaces with laterally adjacent spaces of adjacent columns being generally aligned with each other to form a grid-like array of said spaces defining a path for movement of said pieces in either a horizontal or vertical direction,

a plurality of starting zones to provide each player of the game with designated spaces for initial positioning of one of said sets therein,

a plurality of distinguishable finishing zones to provide each



player of the game with designated spaces for final positioning of one of said sets therein,

said finishing zones being formed in each of the respective corners of said playing surface,

said starting zones corresponding to each of said distinguishable sets being positioned adjacent to each side of one of said finishing zones, and

a chance device operable by players of said game apparatus for determining the possible number of spaces a particular playing piece shall move along said playing surface for movement from a selected one of said starting zones to a selected one of said finishing zones.

4,124,214

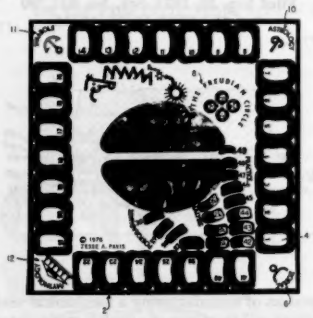
METHOD AND APPARATUS FOR INTERPRETIVE GAME

Jesse A. Pavis, 35 Clark St., Brooklyn, N.Y. 11201

Filed Aug. 30, 1976, Ser. No. 718,451

Int. Cl.[2] A63F *3/00*

U.S. Cl. 273—249 **21 Claims**



1. A method of playing a game for a plurality of players comprising the steps of:

selecting by chance one of a plurality of player-movement-determining items, each of said items indicating a question of one of a plurality of different levels of difficulty and having at least two possible responses of varying validity, each of said possible responses having a respective relative answer value corresponding to the validity of the response and the level of difficulty of the corresponding question;

selecting one of said possible responses; and

adjusting a scoring device in accordance with the relative answer value of the selected response.

10. A game designed to test player's abilities in a field of knowledge and to assign each player to one of a predefined set of progressive achievement levels, comprising:

a scoring device for displaying each player's achievement level, said scoring device initially showing the lowest level for each player;

question posing means including a plurality of subsets of questions in said field of knowledge to be answered by the players, each subset having questions of a fixed level-advancement value different from other subsets;

a selector operated by each player for randomly indicating a subset from which a question is to be answered, said selector being adapted to indicate each question subset with a probability related to the level-advancement value thereof; and

means for providing a level-adjustment value for each player in accordance with the answer he provides for a selected question and the level-advancement value of the question, said level-adjustment value being combinable with the achievement level indicated for that player by said scoring device to produce an updated achievement level.

4,124,215

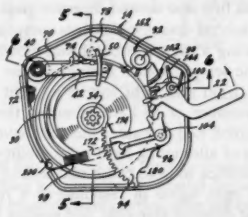
INERTIAL PHONOGRAPH DEVICE

Gabriel Marason, Jr., and Harold B. Collins, both of Hawthorne, Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 21, 1977, Ser. No. 761,379

Int. Cl.[2] G11B *3/00*

U.S. Cl. 274—1 A **16 Claims**



1. In a phonograph device including a needle for tracking a sound track, a speaker cone and a tone arm having said needle depending therefrom, said tone arm transmitting vibrations from said needle to said speaker cone, the improvement which comprises:

a flywheel rotatably mounted within said device;

actuating means for suddenly imparting a predetermined rotational force to said flywheel, said flywheel running down at a predetermined rundown speed subsequent to cessation of said force;

a recorded member mounted for movement in response to rotation of said flywheel and having at least one sound track engageable by said needle, said sound track being pre-recorded to match the rundown speed of said flywheel; and

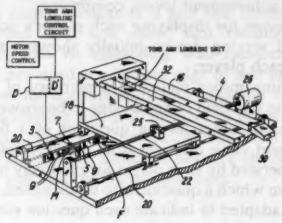
means coupled to said actuating means for engaging said needle with said sound track upon the imparting of said rotational force whereby to reproduce said sound track in response to rotation of said flywheel.

4,124,216

PHONOGRAPH

N. Krebs Sörensen, Struer, Denmark, assignor to Bang and Olufsen A/S, Denmark

Filed May 16, 1975, Ser. No. 578,186
Claims priority, application United Kingdom, May 16, 1974, 21692/74
Int. Cl.[2] G11B 3/10
U.S. Cl. 274—23 A 26 Claims



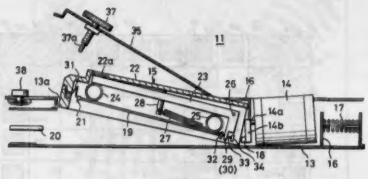
1. A phonograph provided with means for detecting the tone arm reaching the outlet groove of a record and for effecting operation control in response to this detection, said detecting means being adapted so as to respond to an increased speed of the tone arm motion relatively to the normal playing speed thereof, characterized in that said detecting means comprise a first detector element arranged so as to be movable with said tone arm and a second detector element arranged in a stationary manner relative to the chassis of the phonograph so as to be passed by said first detector element by the movement of the tone arm at least through the path corresponding to the tone arm moving in the outlet groove of a record, one of said first or second detector elements being constituted by an elongated member extending in the direction of a relative movement between said first and second detector elements, the other of said first or second detector elements comprising a light source for illuminating a narrow area of said elongated element and photoelectric sensing means arranged so as to be operable to detect light from said light source as light reflected by said elongated member or as light admitted through transparent portions thereof, said elongated member having a row of member portions of alternating light reflectability or of alternating light transparence so as to cause said sensing means to receive a pulsating light signal in response to a relative movement between said detector elements, said sensing means being operatively connected to a detector unit including means for producing a control signal for effecting said operation control in response to the pulse frequency of said pulsating light signal increasing above a predetermined value, said elongated member being extended so as to pass along or be passed by said other detector element by the movement of the tone arm through the entire path corresponding to playing of a record of standard size, said elongated member having at least one localizer portion situated so as to be located for cooperation with said other detector element when the tone arm assumes a position corresponding to start playing of said record, said at least one localizer portion being prepared so as to cause the light signal received by said sensing means to change its character in response to the localizer portion being moved into operative engagement with said sensing means, said sensing means being additionally connected with a second detector unit operable to detect said change of light signal character and to produce an output signal in response thereto, said output signal being fed to a control circuit for a tone arm lowering arrangement so as to condition lowering of the tone arm at the correct place to start playing of the record.

4,124,217

SIGNAL PICK-UP APPARATUS FOR REPRODUCING A RECORDING DISC

Osamu Tajima, Ayase, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Apr. 12, 1977, Ser. No. 786,787
Claims priority, application Japan, Apr. 12, 1976, 51-40243; Apr. 12, 1976, 51-40244
Int. Cl.[2] G11B 3/02
U.S. Cl. 274—37 10 Claims



1. A signal pick-up apparatus for reproducing a recording disc, comprising:

a pick-up cartridge comprising a pick-up cartridge casing detachably loaded at a predetermined position on a pick-up apparatus structure,

a rigid stylus arm support member rotatably supported at one end thereof within said casing,

a pick-up arm having a distal end with a reproducing stylus mounted thereon to make contact with a recording disc,

elastic means for supporting said pick-up arm with respect to said arm support member, and

means within said casing for urging said stylus arm support member in a direction for retracting said pick-up arm away from said recording disc with a predetermined relationship between the stylus arm support member and the pick-up arm; and

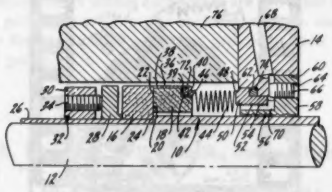
depressing means on the apparatus structure for depressing the other end of the stylus arm support member without changing said predetermined relationship when the pick-up cartridge is loaded into the predetermined position on the apparatus structure, said depression being in a direction for causing the reproducing stylus of said pick-up arm to contact the recording disc and further causing said elastic means to deform only after the stylus makes contact with the recording disc.

4,124,218

MECHANICAL SEAL MANUFACTURING PROCESS

Robert S. Wentworth, Jr., Temecula, Calif., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 29, 1977, Ser. No. 837,790
Int. Cl.[2] F16J 15/06, 15/36
U.S. Cl. 277—1 6 Claims



1. In a process of manufacturing a mechanical seal assembly having a pair of seal rings one of which is stationary and one of which is rotatable, and one of which is associated with a cylindrical ferrule which forms a substantially rectangular cross-sectional cavity with its seal ring, the improvement comprising assemblying a seal ring, an annular gasket having a parallelo-

gram shaped cross-section and the cylindrical ferrule with said gasket in the cavity, and radially expanding and deforming said gasket by the application of assembly pressure on the seal ring and ferrule until the gasket assumes substantially the cross-sectional shape of said cavity and substantially fills said cavity.

4,124,219

SLIDE RING SEAL

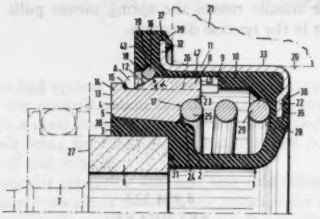
Klaus-Jürgen Uhrner, Leingarten, Fed. Rep. of Germany, assignor to Kupfer-Asbest-Co. Gustav Bach, Heilbronn, Fed. Rep. of Germany

Filed Nov. 17, 1977, Ser. No. 852,487

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1976, 2652563

Int. Cl.[2] F16J *15/36*

U.S. Cl. 277—40 **17 Claims**



1. A slide ring seal structure for sealing machine elements rotatable about an axis, especially for sealing pump shafts, which includes an about rotation-symmetric housing having a bottom extending transverse to the axis of said seal structure, a primary seal forming a slide ring with a sliding surface and being located in the interior of said housing, a bellows-shaped annular secondary seal a pre-loaded spring arranged between said bottom and said slide ring and continuously urging the latter away from said bottom, said secondary seal having a first conical surface flaring in the direction of said sliding surface of said slide ring, and a clamping member arranged in said housing and coaxially surrounding said secondary seal and having a second conical surface corresponding to said first conical surface and slidably engaging the latter.

4,124,220

LUBRICANT SEALS

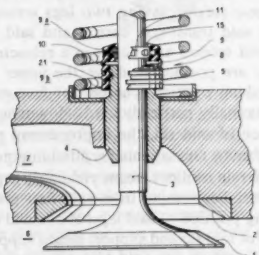
Miguel A. Leone, Anchorena 880, Olivos, Buenes Aires, Argentina, and Americo Castellani, Buenos Aires, Argentina, assignors to Miguel A. Leone, Buenos Aires, Argentina

Filed Dec. 15, 1976, Ser. No. 750,690

Claims priority, application Argentina, Dec. 29, 1975, 261792

Int. Cl.[2] F16J *15/52;* **F01M** *9/10*

U.S. Cl. 277—162 **11 Claims**



1. A lubricant seal for a cylindrical member to be mounted for relative movement in a bushing, the seal comprising a tubular member formed of elastomeric material and including a first portion having a first axially extending bore dimensioned so as to loosely surround the cylindrical member to be sealed when positioned thereabout, a second portion having a second axially extending bore dimensioned so as to tightly fit the bushing and in sealing engagement therewith when positioned thereon, and a flexible bellows forming an integral part of the tubular member and joining said first and second portions in order to compensate for any misalignment between the cylindrical member and the bushing; said first bore having an upper annular edge; a metering ring formed of a rigid non-metallic self lubricating material having a coefficient of expansion substantially higher than that of metal anchored in said first portion in a manner permitting radial expansion; said ring having a bore dimensioned to closely fit the cylindrical member and having an exposed upper surface projecting radially inwardly of said upper annular edge and therebelow, and at least one capillary passage in said ring opening at the surface of said bore, whereby lubricant oil collected in an open annular receptacle defined by said exposed upper ring surface, said upper annular edge of said first portion and by the adjacent surface of the cylindrical member when mounted in the bushing flows in a self-controlled and metered manner through the capillary passage and into the space between the cylindrical member and the bushing.

4,124,221

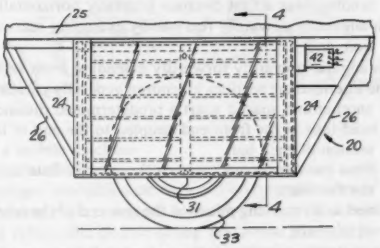
SPRAY GUARD FOR VEHICLES

Harford E. Goings, 9329 Battle St., Manassas, Va. 22110

Filed Jan. 21, 1977, Ser. No. 760,982

Int. Cl.[2] B62B *39/00*

U.S. Cl. 280—154.5 R **2 Claims**



1. A spray guard for vehicles and the like comprising a pair of tracks each having a generally horizontal leg and vertical leg interconnected by an arcuate portion wherein said horizontal leg is secured to the base of said vehicle while the vertical leg is substantially aligned with the outer extent of said base, angle support bars connected and extending from the terminal portion of said vertical legs remote from said base connected to said base to provide additional support, and upper and lower horizontal support braces interconnecting said vertical legs for rigidification, said upper and lower horizontal support braces themselves detachably interconnected substantially along their midpoint so as to provide a supporting frame network for said panel to withstand any debris ejected from the tire to said panel, said tracks secured to the vehicle and positioned one in front of and one behind a wheel of the vehicle and extending downwardly outwardly of the wheel, an endless chain extending through each of said tracks, a flexible panel defined by a plurality of small panel elements interconnected in series by rod members which tend to rigidify said panel elements from deflection and deformation in a direction transverse to said rods and further defined in that the diameter of said rods are substantially less than the width of said small panel elements and said flexible panel is mounted for sliding movement in said track means on said tracks for driving said endless chain, and means securing said panel to said chain whereby upon move-

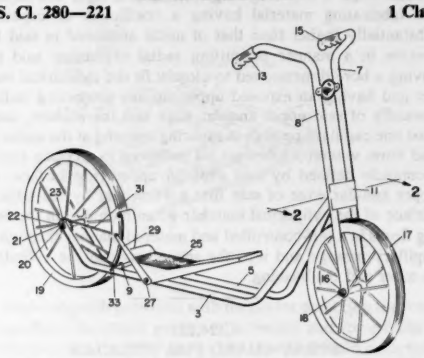
ment of said chain said panel will be moved downwardly to a position opposite said wheels.

4,124,222

TREADLE SCOOTER

Walter Moe, Los Angeles, and John A. Wessels, Santa Monica, both of Calif., assignors to Diker-Moe Associates, Los Angeles, Calif.

Filed Sep. 19, 1977, Ser. No. 834,676
Int. Cl.[2] B62M *1/04*
U.S. Cl. 280—221 **1 Claim**



1. The sport vehicle for carrying a rider in a generally standing position comprising: a frame member which includes:

at least two bars, each having an intermediate section extending over a first distance generally horizontally,

an angularly upwardly rearwardly extending rearward section, and

an angular upwardly forwardly extending front section;

the intermediate sections extending generally parallel to one another and spaced apart a predetermined distance;

a head tube at the front end coupled to the end of the front section of each bar;

a cross bar connected between the intermediate sections of the two bars;

wheel axle receiving means at the rear end of the rear section of the bars;

an upstanding steering column containing two spaced apart handgrip means and two spaced apart generally parallel portions containing wheel axle receiving means;

means coupling the column to the head tube means for permitting pivotal movement of the column relative to the frame member;

a rockable treadle member for supporting a rider on the frame member;

the treadle member having a side surface geometry of an unsymmetrical inverted "V" shape with one arm extending a greater distance from the apex thereof than the other and a platform surface over the apex;

pivot means coupled to the intermediate section of the bars of the frame member and to the treadle member for permitting the treadle member to be rocked forwardly and rearwardly, alternately, essentially about the apex;

the treadle being of length and width dimensions to cover at least most of the length of the upper surface of the bars and at least the distance between the two bars;

a front wheel mounted for rotation to the steering column;

a rear wheel mounted for rotation to the rearward section of the two bars, the rear wheel defining an axis of rotation;

sprocket means mounted coaxially with the rear wheel for rotation about the axis;

free-wheeling clutch means coupled between the sprocket means and the rear wheel for coupling rotational movement of the sprocket to the wheel in one direction of rotation and decoupling in the reverse direction of rotation;

a rearwardly extending arm attached to the treadle means for joint movement therewith, the arm extending at least up to the axis of rotation with the treadle in an unoccupied condition;

elongate chain means;

spring means; the spring means having one end coupled to the frame at a position underlying and forward of the axis of rotation and the other end connected to an end of the chain for maintaining the chain taut;

the other end of the chain being coupled to an upper end of the arm; and

the chain engaging the sprocket;

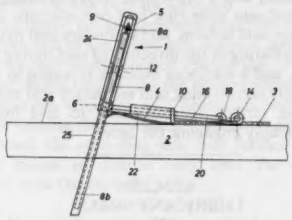
wherein forward rocking of the treadle means draws the chain end attached to the arm upwardly and forwardly to turn the sprocket and wherein during backward rocking of the treadle means the spring means pulls the chain means in the reverse direction.

4,124,223

SKI BRAKE

Axel R. Kubelka, Vienna, Austria, assignor to TMC Corporation, Baar, Switzerland

Filed Jan. 26, 1977, Ser. No. 762,751
Claims priority, application Austria, Jan. 28, 1976, 601/76
Int. Cl.[2] A63C *7/10*
U.S. Cl. 280—605 **12 Claims**



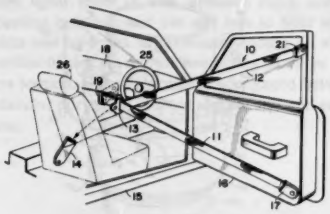
1. In a ski brake having a holding member and first pivot means for pivotally securing said holding member to a ski for movement about a first axis transverse of the longitudinal axis of said ski, a transverse carrier extending perpendicularly with respect to the longitudinal axis of the ski, second pivot means for pivotally securing said transverse carrier to said holding member for movement about a second axis parallel to said first axis, said transverse carrier having two legs arranged at the sides of said ski, said transverse carrier and said legs being movable about said second axis between a retracted position wherein said legs are positioned above the upper surface of said ski and a braking position wherein the free ends of said legs project substantially perpendicularly downwardly below the bottom surface of said ski, the improvement comprising wherein said first pivot means includes a holding part secured to said ski and wherein resilient means yieldingly urges the end of said holding member remote from said first pivot axis, at least in the braking position of said legs, above and away from the upper surface of said ski and support means supporting said legs for movement relative to said transverse carrier and so that said free ends of said legs move laterally of said longitudinal axis of said ski between positions alongside of and over the top of said ski.

4,124,224

SEAT BELT SYSTEM

Fumio Matsuoka, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 12, 1977, Ser. No. 796,325
Claims priority, application Japan, May 26, 1976, 51-61556
Int. Cl.[2] B60R *21/10*
U.S. Cl. 280—745 **6 Claims**



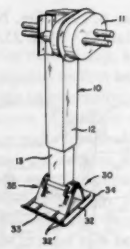
1. A seat belt system for a motor vehicle comprising:
at least one seatbelt obliquely extending from one side of a seat to a point forward of an other side of said seat, said seatbelt being anchored at one end to a rear portion of a door of said vehicle;
a retractor for retracting said seat belt, said retractor being provided forward of said seat and adjacent the center line of said vehicle such that said seat belt extends obliquely from one side of said seat to the other;
a tongue plate coupled to said seat belt; and
a buckle provided adjacent said center line of said vehicle and mounted on a lower in board portion of said vehicle for engagement with said tongue plate whereby a driver is prevented from operating said vehicle when said seat belt system is not in use.

4,124,225

SANDSHOE

Vicente M. Lozada, Centerville; William D. Walther, Kettering, both of Ohio, and Lawrence J. Welp, Highland Heights, Ky., assignors to Dayton-Walther Corporation, Dayton, Ohio

Filed Oct. 14, 1977, Ser. No. 842,049
Int. Cl.[2] B60S *9/02*
U.S. Cl. 280—763 **6 Claims**



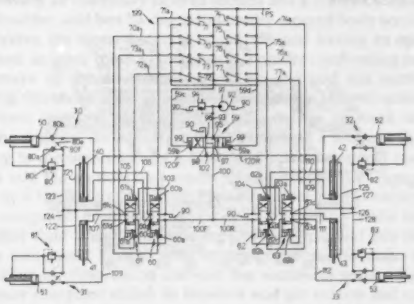
1. An improved sandshoe assembly for a semi-trailer landing gear, comprising a landing gear leg, means at the lower end of the landing gear leg forming a transversely oriented, generally C-shaped downwardly opening yoke, a sandshoe including an inverted generally V-shaped support member and a bottom platform, means connecting said support member to said yoke with the apex of said support member received within said yoke while providing for fore and aft tilting movement on said yoke, means joining said platform to said support member at the bottom edges of the side walls of said member, whereby the weight of the trailer is transferred from said yoke to the apex of said support member and through the side walls of said support member to said platform inducing a tension condition in said platform between said side walls for stiffening said platform against deformation and indentation due to applied loads thereon.

4,124,226

ELECTROHYDRAULIC OUTRIGGER CONTROL SYSTEM

Frank T. Phillips, Swisher, Iowa, assignor to Harnischfeger Corporation, West Milwaukee, Wis.

Filed Oct. 6, 1977, Ser. No. 839,800
Int. Cl.[2] B60S *9/10*
U.S. Cl. 280—765 **11 Claims**



6. In a mobile machine:
four hydraulically operated outrigger assemblies, with two outrigger assemblies on each of two opposite sides of said machine, each outrigger assembly having an extendable and retractable double-acting horizontal extend cylinder and an extendable and retractable double-acting vertical stabilizer cylinder;
a source of pressurized hydraulic fluid for operating said cylinders;
and an electrohydraulic control system for supplying fluid from said source to operate said cylinders and comprising:
a double solenoid operated main valve having an extend position and a retract position;
four double solenoid operated cylinder control valves, each cylinder control having two operating positions;
and eight selector switches, each selector switch having an extend position wherein it operates said main valve to extend position to supply pressurized fluid from said source to said cylinder control valves and wherein it operates a cylinder control valve to one operating position to supply fluid from said cylinder control valve to one of said horizontal extend cylinders or, alternately, to one of said vertical stabilizer cylinders to operate a cylinder in the extend direction, each selector switch having a retract position wherein it operates said main valve to retract position to supply pressurized fluid from said source to said cylinders and wherein it operates a cylinder control valve to another operating position to exhaust fluid from one of said horizontal extend cylinders or, alternately, from one of said vertical stabilizer cylinders to operate a cylinder in the retract direction.

4,124,227

OXIME ETHERS OF MICHLER'S HYDROL, METHOD OF PRODUCING SAME AND PRESSURE-SENSITIVE RECORDING SYSTEMS CONTAINING SUCH COMPOUNDS

Henn Ruus, Los Angeles, Calif., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed May 5, 1977, Ser. No. 794,098
Claims priority, application Belgium, May 31, 1976, 167467
Int. Cl.[2] B41L *1/36*
U.S. Cl. 282—27.5 9 Claims

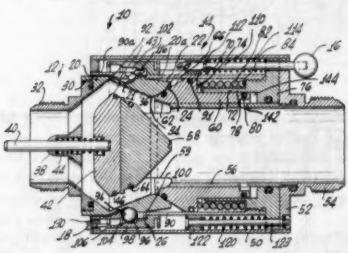
2. In a pressure-sensitive recording system comprising a layer containing a substantially colorless color precursor compound and a layer of an electron-acceptor material, the improvement which comprises utilizing acetophenone oxime ether of Michler's hydrol as said color precursor compound.

4,124,228

PRESSURE-BALANCED FLUID COUPLING

Donald L. Morrison, Yorba Linda, Calif., assignor to Kaiser Aerospace & Electronics Corporation, Irvine, Calif.

Filed Mar. 24, 1977, Ser. No. 780,598
Int. Cl.[2] F16L *29/00, 37/22*
U.S. Cl. 285—1 3 Claims



1. A fluid coupling for connecting two fluid pipeline sections, comprising:

a first coupling member of generally cylindrical shape connectible to one section of pipeline, having an exterior annular groove thereon;

a second coupling member including

nipple means connectible to the other section of pipeline, an inner cylinder rigidly connected to said nipple means,

a generally cylindrical barrel sized to receive said first coupling member therein and slidably mounted with respect to said inner cylinder and said nipple means, said barrel having at least one opening through its wall,

at least one latching element carried in said barrel opening,

a lock ring of graduated internal diameter disposed over said barrel and movable with respect to said barrel between a locked position in which said latching element is urged inwardly by said lock ring into engagement with said annular groove, and an unlocked position in which said latching element is free to move outwardly from said groove,

sleeve means slidably mounted over said inner cylinder,

first resilient means for urging said sleeve means into sealing contact with said first coupling member, and

second resilient means located to resist axial separation of said nipple means and said barrel; and

manually operable means for moving said lock ring to said unlocked position without application of a separation force;

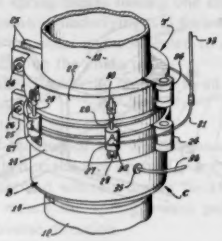
whereby said first and second coupling members may be uncoupled by applying a tensile force between said first coupling member and said nipple means, said barrel being thereby displaced with said first coupling member until said unlocked position of said lock ring is reached.

4,124,229

RIGID CONNECTOR FOR PIPE AND METHOD OF MAKING THE SAME

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco, Inc., Ventura, Calif.

Filed May 4, 1977, Ser. No. 793,496
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—18 19 Claims



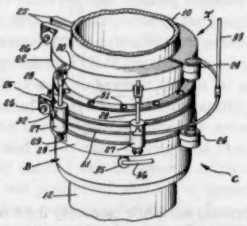
1. A rigid pipe connector comprising: a pin and a box; said pin having an externally tapered section and a transverse make up surface; said box having an internally tapered body section to receive the tapered section of said pin and having an inner transverse make up surface confronting said pin make up surface; said pin section and said box section having therebetween axially spaced companion tapered sealing portions; said box section having port means between said sealing portions for admission therebetween of a pressure fluid acting to circumferentially expand said box section and compress said pin section; and means on said pin and box engageable by a loading tool for axially relatively forcing said sections and compressively loading said make up surfaces while said pressure fluid is acting on said sections; said pin and box sections being held against axial separation with said make up surfaces in compression and said box section in tension by a pressure energized shrink fit between said pin section and said box section upon relief of said pressure fluid.

4,124,230

RIGID PIPE CONNECTOR WITH LOCKING SCREWS AND METHOD OF MAKING THE SAME

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco, Inc., Ventura, Calif.

Filed May 4, 1977, Ser. No. 793,497
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—18 12 Claims



1. A lockable rigid pipe connector comprising: a pin and a box; said pin having an externally tapered section and a transverse make up shoulder; said box having an internally tapered body section to receive the tapered section of said pin and having an inner transverse make up shoulder confronting said pin make up shoulder; said pin section and said box section having therebetween axially spaced companion tapered sealing portions; said box section having port means between said sealing portions for admission therebetween of a pressure fluid

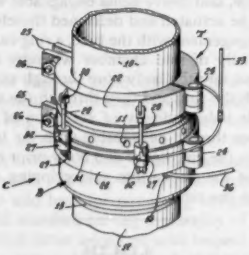
acting to circumferentially expand said box section and compress said pin section; and means on said pin and box engageable by a loading tool for axially relatively forcing said sections and compressively loading said make up shoulders while said pressure fluid is acting on said sections; said pin and box sections being held against axial separation with said make up shoulders in compression and said box section in tension by a pressure energized shrink fit between said pin section and said box section upon relief of said pressure fluid; and locking means coacting between said pin and box to hold said pin in compression and said box in tension including an axially extended portion of said pin section projecting from the open end of said box section, and screw means coengaged between said axially extended portion of said pin section and said end of said box section.

4,124,231

RIGID PIPE CONNECTOR WITH RADIALLY SHIFTABLE LOCK ELEMENTS AND METHOD OF MAKING THE SAME

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco, Inc., Ventura, Calif.

Filed May 4, 1977, Ser. No. 793,523
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—18 18 Claims



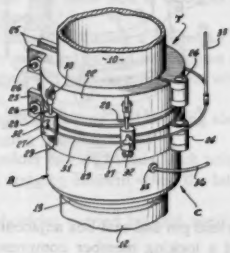
1. A rigid pipe connector comprising: a pin and a box; said pin having an externally tapered section and a transverse make up shoulder; said box having an internally tapered body section to receive the tapered section of said pin and having an open end and an inner transverse make up shoulder confronting said pin make up shoulder; said pin section and said box section having therebetween axially spaced companion tapered sealing portions; said box section having port means between said sealing portions for admission therebetween of a pressure fluid acting to circumferentially expand said box section and compress said pin section; and means on said pin and box engageable by a loading tool for axially relatively forcing said sections and compressively loading said make up shoulders while said pressure fluid is acting on said sections; said pin and box sections being held against axial separation with said make up shoulders in compression and said box section in tension by a pressure energized shrink fit between said pin section and said box section upon relief of said pressure fluid; and locking means coacting between said pin and box to hold said pin in compression and said box in tension, said locking means comprising circumferentially spaced locking elements projecting radially from one of said pin and box and lockingly engaged with the other of said pin and box.

4,124,232

RIGID PIPE CONNECTOR WITH LOCK ELEMENTS AND METHOD OF MAKING THE SAME

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco, Inc., Ventura, Calif.

Filed May 4, 1977, Ser. No. 793,524
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—18 14 Claims



1. A rigid pipe connector comprising: a pin and a box; said pin having an externally tapered section and a transverse make up shoulder; said box having an internally tapered body section to receive the tapered section of said pin and having an open end and an inner transverse make up shoulder confronting said pin make up shoulder; said pin section and said box section having therebetween axially spaced companion tapered sealing portions; said box section having port means between said sealing portions for admission therebetween of a pressure fluid acting to circumferentially expand said box section and compress said pin section; and means on said pin and box engageable by a loading tool for axially relatively forcing said sections and compressively loading said make up shoulders while said pressure fluid is acting on said sections; said pin and box sections being held against axial separation with said make up shoulders in compression and said box section in tension by a pressure energized shrink fit between said pin section and said box section upon relief of said pressure fluid; and interfacial locking means between said pin and box sections permitting stabbing of said pin into said box and compressive loading of said makeup shoulders and automatically coacting between said pin and box sections to prevent axial separation thereof in response to the expansive and compressive forces applied to said locking means by the respective pin and box sections.

4,124,233

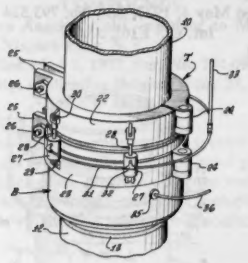
RIGID PIPE CONNECTOR WITH LOCK RING AND METHOD OF MAKING THE SAME

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco, Inc., Ventura, Calif.

Filed May 4, 1977, Ser. No. 793,528
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—18 26 Claims

1. A rigid pipe connector comprising: a pin and a box; said pin having an externally tapered section and a transverse make up shoulder; said box having an internally tapered body section to receive the tapered section of said pin and having an open end and an inner transverse make up shoulder confronting said pin make up shoulder; said pin section and said box section having therebetween axially spaced companion tapered sealing portions; said box section having port means between said sealing portions for admission therebetween of a pressure fluid acting to circumferentially expand said box section and compress said pin section; and means on said pin and box engageable by a loading tool for axially relatively forcing said sections and compressively loading said make up shoulders while said pressure fluid is acting on said sections; said pin and box sections being held against axial separation with said make up shoulders in compression and said box section in tension by a pressure energized shrink fit between said pin section and said

box section upon relief of said pressure fluid; and locking means coacting between said pin and box to hold said pin in compression and said box in tension including opposed locking



shoulders on said pin and said box adjacent to the open end of said box and a locking member compressively disposed between said locking shoulders; said tapered pin and box sections being between said locking means and said make up shoulders.

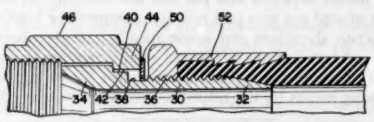
4,124,234

HOSE COUPLING

James B. Clark, Mantua, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed May 19, 1977, Ser. No. 798,711
Int. Cl.[2] F16L *33/22*
U.S. Cl. 285—247 **5 Claims**

(PRIOR ART)



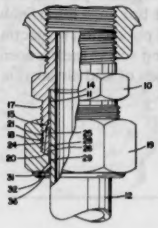
1. A hose coupling subassembly comprising a nipple having an enlarged head at one end thereof, a tapered portion at the other end thereof, and an externally threaded portion adjacent one end of said tapered portion, said threaded portion being in threaded engagement with a hose socket axially spaced from said head, a groove between said head and said threaded portion, said groove being adjacent the other end of said threaded portion and having a diameter approximately equal to the root diameter of said threaded portion said head having a maximum diameter that is greater than the major diameter of said thread and having a transverse shoulder at the inner end of said head, a nut over said head and having an inturned flange with a bore therethrough that is larger in diameter than said external thread but smaller in diameter than said maximum head diameter whereby said flange is engageable with said transverse shoulder, and a flat flexible washer in said groove having an inner diameter less than the major diameter of the thread but greater than the minor diameter of the thread allowing said flexible washer to be turned on to said thread and to be advanced thereon for receipt in said groove, said flexible washer having an outer diameter greater than the diameter of said bore whereby the washer is engageable with said nut and said thread to retain the nut on said nipple.

4,124,235

TUBE COUPLING

Darwin R. Grahl, and Cary Haramoto, both of Newark, N.Y., assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Continuation of Ser. No. 664,532, Mar. 8, 1976, Pat. No. 4,059,297. This application May 9, 1977, Ser. No. 795,255
The portion of the term of this patent subsequent to Nov. 29, 1994, has been disclaimed.
Int. Cl.[2] F16L *19/08*
U.S. Cl. 285—340 **12 Claims**



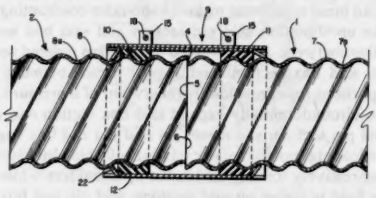
1. A coupling for tubes comprising a body having a bore for receiving a tube said bore having an entrance at one end of the body and terminating at a shoulder of lesser diameter than said bore and against which shoulder the end of the tube may abut to prevent the tube from passing completely through said body when inserted into the bore through said entrance, a nut, adjustable interengaging means on the nut and body operable for moving the nut toward the body, said nut and body when interengaged forming a chamber, a deformable sleeve within said chamber, said nut and sleeve each having a bore for receiving the tube, said sleeve being engageable with the nut and body so as to be actuated and deformed thereby into gripping and sealing engagement with the tube, a ring carried by the nut axially outwardly of said chamber whereby a tube inserted through the nut into the body bore through said entrance first passes through the ring and then through the sleeve, said ring being operable independently of actuation of the sleeve and having portions thereof engageable with the tube for holding the tube within the nut, sleeve and body prior to actuation and deformation of the sleeve into said gripping and sealing engagement with the tube.

4,124,236

COUPLING FOR HELICALLY CORRUGATED SPIRAL PIPE

Kirby J. Guidry, P.O. Box 14386, Baton Rouge, La. 70808

Filed Jan. 19, 1977, Ser. No. 760,702
Int. Cl.[2] F16L *17/04*
U.S. Cl. 285—373 **3 Claims**



1. A coupling for providing a substantially soil tight joint between abutting ends of helically corrugated, spiral pipe which comprises:

(a) a pair of flexible, pre-formed strips, each strip having a top and bottom surface, said bottom surfaces having helical corrugations which are of a similar pitch and depth as said pipe's corrugations, each strip being circumferentially continuous, each strip fitting about one of said pipe's outer

circumference near its abutting end with said strip's helical corrugations and mating with said pipe's corrugations, and

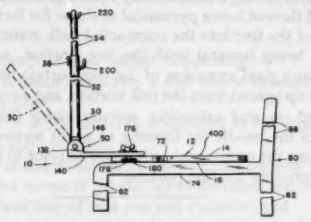
(b) a tightening band having a width sufficient to fit over both of said strips positioned on said pipes and having clamping means to clamp said strips in radial compression between said band and said pipes, said band having a bottom band surface in contact only with said top strip surface, said bottom band surface being substantially flat in those areas in contact with said top strip surface, said band, strips and clamping means being all so constructed and arranged that said strips are free to expand in an axial direction anywhere between their said top and bottom surfaces when said strips are radially compressed into engagement with said pipes and inner band surface by said clamping means.

4,124,237

MACRAME-MAKING STAND

Salvatore J. Catania, 131 N. 40th St., Omaha, Nebr. 68131

Filed Dec. 9, 1976, Ser. No. 748,924
Int. Cl.[2] D04G *5/00*
U.S. Cl. 289—18 **12 Claims**



1. A macrame support stand comprising a base having a normally substantially horizontal upper surface, the underside of said base having lowermost points lying substantially in a horizontal plane, an elongated standard extending transversely to and upwardly from said base, means attaching said standard to said base capable of firmly holding said standard in place with respect to said base for remaining upright during macrame work, said standard having a plurality of sections adjacent ones of which latter telescope with respect to each other, clamping means mounted on said standard for releasably fixing adjacent sections of said standard into fixed relationships with each other for adjusting the height of said standard, said base having a substantial portion extending rearwardly from said standard on which an operator's weight can be placed for supporting said standard with stability anchoring means attached to the top of said standard and on which at least a portion of a macrame device can be held, said anchoring means comprising at least a shoulder surface transverse to the elongation of said standard.

4,124,238

LATCH BOLT MECHANISM

Robert F. Bischoff, Jr., 30 Fairmont Ave., Morristown, N.J. 08094

Filed Nov. 3, 1975, Ser. No. 628,137
Int. Cl.[2] E05C *1/16*
U.S. Cl. 292—173 **6 Claims**

1. In a latch bolt mechanism of the general type, comprising

(a) a latch bolt movable into retracted, extended and dead-bolt positions,

(b) an auxiliary bolt cooperatively associated with said latch bolt and movable into retracted and extended positions,

(c) striker plate means engageable with said latch and auxiliary bolts,

(d) said striker plate means having means for displacing said latch and auxiliary bolts from extended to retracted positions and having recess means for receiving said latch bolt and providing for displacement of said latch bolt from its retracted position to its dead-bolt position, and

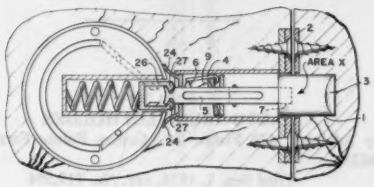
(e) dogging means associated with said latch and auxiliary bolts whereby, when said auxiliary bolt is extended, said latch bolt is blocked from extending beyond its extended position and, when said auxiliary bolt is held in its retracted position, said latch bolt is freed to extend to its dead-bolt position,

(f) said dogging means including a lever-like dogging element pivotally mounted in said mechanism and movable between dogging and releasing positions with respect to said latch bolt,

(g) means for yieldably urging said dogging element into its latch bolt dogging position,

(h) a locking shoulder carried by said latch bolt and engageable with said dogging element when the latter is in dogging position,

(i) a camming shoulder carried by said auxiliary bolt and



operable upon movement of said latch bolt from retracted to extended positions while said auxiliary bolt is retained in retracted position to displace and dogging element to its release position and thereby permit said latch bolt to extend further to said dead-bolt position, the improvement characterized by

(j) said latch and auxiliary bolts having rearwardly extending slide portions of smaller combined cross section than said latch and auxiliary bolts,

(k) said slide portions carrying said locking and camming shoulders,

(l) a tubular housing slideably containing and guiding said latch and auxiliary bolts and at least partly enclosing said slide portions thereof,

(m) said dogging element being pivotally mounted within said tubular housing and having a laterally displaceable leg portion extending rearwardly for motion limiting engagement with said locking shoulder,

(n) said leg portion being laterally displaceable by rearward movement of said camming shoulder.

4,124,239

WING WINDOW LOCK

Jack H. Horton, 8050 NE. Central, Minneapolis, Minn. 55432

Filed Jun. 9, 1977, Ser. No. 805,139
Int. Cl.[2] E05C *3/04*
U.S. Cl. 292—210 **9 Claims**

1. A swing wing window lock for no draft ventilator windows on motor vehicles, boats and the like comprising:

(a) a body bracket glass attachment;

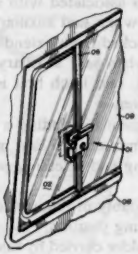
(b) fastener means for attaching said body bracket glass attachment to the glass of said ventilator window;

(c) a lock bar having a bore pivotally connected to said body bracket glass attachment;

(d) a swing wing also pivotally connected to said body bracket glass attachment; whereby said lock bar has lock means to lock said swing wing in a plurality of positions;

(e) said lock means comprising a projection pin on said swing wing having a shape similar to and circumference

somewhat smaller than the inner circumference of said bore, positioned on said swing wing so (as to) that said pin



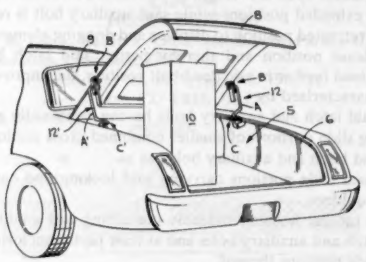
may fit snugly into said bore when said swing wing is in a plurality of positions.

4,124,240

AUTO TRUNK LID HOLDER

Roy Adelberg, 430 Fisher Rd., Grosse Pointe Farms, Mich. 48236

Filed Sep. 1, 1976, Ser. No. 719,594
Int. Cl.[2] E05C *17/04*
U.S. Cl. 292—262 **1 Claim**



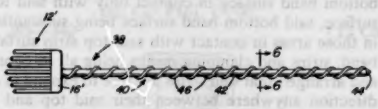
1. An automobile trunk lid holder comprising a substantially rigid single rod having first and second ends and an offset portion therebetween, a first engagement means at the first end of said rod for releasably gripping the margin of a trunk lid and a second engagement means at the second end of said rod for releasably gripping the channel of a trunk lid frame so as to hold the trunk lid in the open position, said first engagement means being rotatably secured to said first rod ends and having clamp means including a fixed member and a movable member and handle actuated cam means for actuating said clamp means to releasably lock said clamp means to the margin of the trunk lid by movement of said handle, said second engagement means including an arm which is lengthwise adjustably secured to said rod adjacent said second rod end to accommodate the trunk lid frame, said arm having two bends dividing said arm into first and second terminal portions, said first terminal portion being apertured and receiving said rod and said second terminal portion having a free end generally opposing said second rod end with said arm and said second rod end cooperating to provide a lever and fulcrum combination when in engagement with the trunk lid frame, said first and second engagement means in cooperation with said offset means producing complementary forces assuring optimum gripping of the lid and frame.

4,124,241

NON-FERROUS PITCHFORK FOR USE IN SILO

Anthony P. Romero, 515 Julian St., Denver, Colo. 80204

Filed Jun. 28, 1977, Ser. No. 810,796
Int. Cl.[2] A01B *1/20*; A01D *9/00*
U.S. Cl. 294—51 **1 Claim**



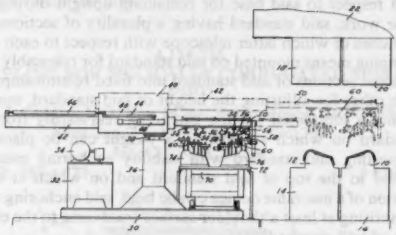
1. A pitchfork for use in silos, comprising a tine portion and a shank portion, the former being constructed from a non-ferrous heavy metal having a high density for preventing creation of sparks when the tine portion strikes a compacted bulk material disposed in the silo and adding extra weight helpful in sinking the fork into compacted material, the tine portion including a base and a plurality of substantially parallel, straight tines extending codirectionally from the base, the tines being of different lengths terminating in free ends defining a concave arc opening toward the base of the tine portion, each of the tines having a substantially square cross section, with the free end thereof being pyramidal in shape for facilitating penetration of the tine into the compacted bulk material, the shank portion being integral with the tine portion, and forming a handle as a rigid extension of the tine portion terminating is a pointed tip spaced from the tine portion, and a continuous flute provided on and extending spirally along the longitudinal extent of the handle for forming an auger means arranged for dislodging the compacted bulk material prior to penetration of the material by the tine portion.

4,124,242

METHOD AND APPARATUS FOR LOADING PRESSES

Herman M. Canner, Detroit, Mich., assignor to Sterling Detroit Company, Detroit, Mich.

Filed May 9, 1977, Ser. No. 795,179
Int. Cl.[2] B29D *9/00*
U.S. Cl. 294—61 **2 Claims**



1. A device for moving a sheet of penetrable flacid material from a lay-up position to a position on a mold which comprises:

(a) a frame,

(b) a plurality of horizontally spaced support means each mounted on said frame for vertical adjustment relative to a horizontal plane,

(c) a plurality of straight, smooth pins all mounted vertically on said respective support means in parallel relation to each other,

(d) means for moving said frame and support means vertically in a direction parallel to said respective pins into a position penetrating a sheet to be moved,

(e) means for shifting a plurality of said pins angularly relative to others of said pins;

(f) and means to shift said frame laterally from a pick-up position to loading position over a mold, said rods being

vertically adjustable so they may be readily adapted to varying mold contours.

4,124,243

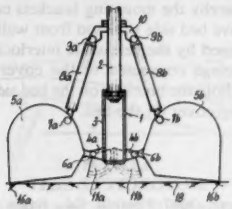
HYDRAULIC ACTUATED GRAB BUCKET

Lucien A. Raffin, Lyons, France, assignor to International Harvester Company, Chicago, Ill.

Continuation-in-part of Ser. No. 689,447, May 24, 1976, abandoned. This application Aug. 1, 1977, Ser. No. 820,471

Int. Cl.[2] B66C *3/16*; E02F *3/44*

U.S. Cl. 294—70 **6 Claims**



1. A dual purpose grab bucket comprising:

a central actuator including a rod and a cylinder, one of which is fixed;

a plurality of shells pivotally connected to the other one of said rod and cylinder;

a plurality of lateral actuators, each having one end pivotally connected to one of the shells and the other end connected to the fixed one of said rod and cylinder; and

valve means for selectively directing hydraulic fluid pressure to one of said central actuator and said plurality of lateral actuators while simultaneously hydraulically locking the other of said central and lateral actuators.

4,124,244

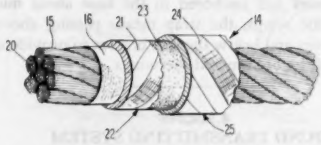
PROTECTIVE PADS FOR OVERHEAD LIFTING

John G. Bryant, 15 Ridgewood Rd., Radnor, Pa. 19087

Filed Dec. 21, 1976, Ser. No. 752,723

Int. Cl.[2] B66C *1/12*

U.S. Cl. 294—74 **21 Claims**



1. In a pad for use between a load and an overhead lifting sling wherein the pad receives a compression load during the lift:

a plurality of layers disposed closely adjacent one another at least one layer to engage the sling and at least another layer to engage the load and each layer comprising band means having a woven construction with warp and woof threads which inter-lock and function to hold one another in the layer to take said compression load and the respective band means being oriented so that as between adjacent band means contiguous parallel planes containing warp threads of one band means respectively angularly intersect warp threads of the other band means.

4,124,245

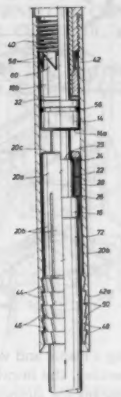
WELL TOOL

Rainer Kuenzel, #2 Gessner Rd., Houston, Tex. 77024

Filed Nov. 11, 1976, Ser. No. 741,036

Int. Cl.[2] E21B *31/02*

U.S. Cl. 294—86.3 **28 Claims**



1. A tool for retrieving an object from a well comprising:

first and second elongate assemblies connected for relative telescopic movement;

gripping means carried by said first assembly and comprising a plurality of radially extendable and retractable gripping elements;

deflecting means carried by said second assembly and engageable with said gripping means upon relative telescopic movement of said assemblies in a first directional mode for effecting radial movement of said gripping elements and disengageable upon relative telescopic movement of said assemblies in a second directional mode opposite to said first mode;

stop surfaces of limited circumferential extent on each of said assemblies, alignable and offsetable by relative rotation of said assemblies, and engageable when aligned to limit relative telescopic movement of said assemblies in said first mode and retain said assemblies in a release position;

respective first cam surfaces on each of said assemblies positioned with at least some of the first cam surfaces of said first assembly at least partially opposed to at least some of the first cam surfaces of said second assembly in said release position and to be operative, in said release position, upon relative telescopic movement of said assemblies in said second mode, to relatively rotate said assemblies to a first switching position in which said stop surfaces are at least partially offset;

and respective second cam surfaces on each of said assemblies positioned with the second cam surfaces of said first assembly at least partially opposed to the second cam surfaces of said second assembly in said first switching position and to be operative, in said first switching position, upon relative telescopic movement of said assemblies in said first mode, to relatively rotate said assemblies to a catch position in which said stop surfaces are fully offset;

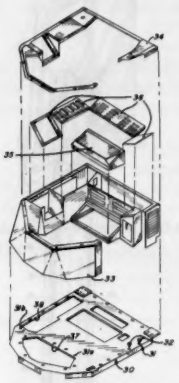
at least some of the cam surfaces on each of said assemblies extending axially and circumferentially.

4,124,246

VEHICLE CAB MOUNTING

William J. Brown, Naperville, and Gerald F. Molloy, Aurora, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 15, 1977, Ser. No. 815,957
Int. Cl.[2] B62D *33/06*
U.S. Cl. 296—28 C **14 Claims**



1. In a vehicle having a frame and vehicle operating controls adapted for floor mounting, the improvement comprising:

resilient mounting means for supporting the controls on the frame;

a cab having a floor portion provided with openings adapted to permit a first portion of said controls to extend upwardly therethrough and a portion of said floor portion adapted to engage said controls as an incident of said cab being set upon said frame; and

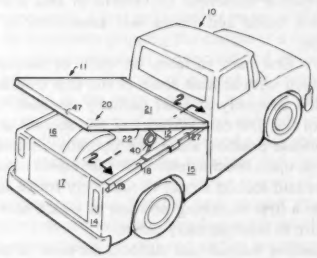
securing means for rigidly securing the cab to the frame and rigidly securing said controls to the cab, said resilient mounting means providing adjustable support of said controls for facilitated securing of the controls to the cab by said securing means.

4,124,247

QUICK DETACHABLE HINGING STRUCTURE

Benjamin L. Penner, 1760 Whitwood La. #1, Campbell, Calif. 95008

Filed Nov. 19, 1976, Ser. No. 743,134
Int. Cl.[2] B60P *7/02*
U.S. Cl. 296—100 **3 Claims**



1. A cover and mounting structure therefor for releasable attachment of the cover to the bed of a pickup truck, said bed having two side walls joined by a front wall with each side wall including a horizontal top, a pair of substantially vertical and opposite facing surfaces, and an inside horizontal underside surface and said front wall having top and forward surfaces, including:

a pair of separate elongated mounting brackets, one for mounting on each side wall of the bed and each including separate surfaces abutting said bed side wall, vertical, horizontal top and horizontal underside surfaces, said horizontal surfaces on each said bracket being separated a fixed distance and separate members extending across the top surface of the front wall and down along the forward surface thereof;

means for releasably interlocking one edge of said cover and corresponding ends of said elongated brackets mounted on the respective side walls and the front wall for allowing pivotal motion therebetween;

a pair of coil springs, each having two ends;

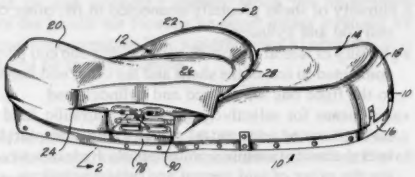
means for releasably attaching one end of each coil spring to said cover and the other coil spring end to a mounting bracket whereby the mounting brackets can be placed on the respective bed side wall and front wall, the cover and brackets joined by the releasable interlocking means and the coil springs connected to the cover and mounting brackets to hold the brackets on the bed side walls thereby fastening the cover on the bed.

4,124,248

MOTORCYCLE SEAT

William J. Mayer, 3647 Foothill Rd., Santa Barbara, Calif. 93105

Filed Oct. 17, 1977, Ser. No. 842,517
Int. Cl.[2] B62J *1/00*
U.S. Cl. 297—204 **21 Claims**



1. An improved motorcycle seat comprising:

(a) a base;

(b) a seat on the base including a seat bottom and a pair of lateral wings, the wings extending upwardly and laterally from the seat bottom;

(c) spring means supporting each of the wings and resisting laterally outward and downward forces thereon, the spring means being attached to the base and having a free end above the base in each wing; and

(d) strap means attached proximate the free ends of the spring means and anchored to the base about midway between the wings, the strap means passing above the spring means and below the seat bottom to provide direct support of the bottom and the wings.

4,124,249

SOUND TRANSMITTING SYSTEM

Charles J. Abbeloos, 5585 Verdi St., Brossard, Quebec, Canada (J4W 1B4)

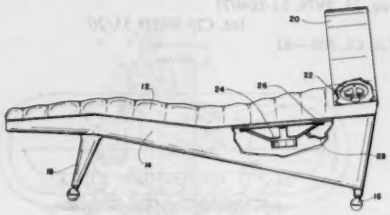
Filed Oct. 25, 1977, Ser. No. 845,257
Int. Cl.[2] A47C *7/42*
U.S. Cl. 297—217 **8 Claims**

1. A sound transmitting system for entertaining and relaxing a person resting on an article of furniture from an outside audio source, said person having a body with a thorax, a head and ears on the head and said article of furniture having a surface supporting the person and a chamber formed therein under the area of the thorax of the person, said sound transmitting system comprising

a thorax speaker mounted in the chamber formed in the article of furniture and positioned to broadcast sound

toward the thorax of the person on the surface of said article of furniture;

a pair of arcuate members substantially coplanarly mounted on said article of furniture at the head of the person but spaced therefrom, said arcuate members being of essentially semicylindrical configuration each extending at a corresponding side of the person's head, said arcuate members having free ends spaced from each other above the head of the person and spaced therefrom, each of said arcuate members having chambers formed therein; and



a plurality of speakers mounted in the arcuate members and positioned to broadcast sound toward the ears of the person, the plurality of speakers and the thorax speaker being electrically connected to the outside audio source whereby the person hears stereophonic sound including high and low frequencies from said plurality of speakers and feels low frequency sound via the thoracic region of the body.

4,124,250

MOTOR VEHICLE SEAT

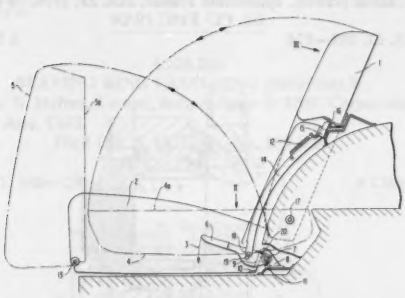
Manfred Weinich, Gechingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Sep. 8, 1977, Ser. No. 831,397

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1976, 2640959

Int. Cl.[2] B60N *1/10*

U.S. Cl. 297—335 **7 Claims**



1. A motor vehicle seat, comprising seat cushion means operable to be pivoted about a fixed pivot shaft located near its lower forward edge and a backrest means with detent means thereon operable to be pivoted about a fixed pivot shaft located near its lower edge, said seat cushion means and said backrest means being operable to be so displaced out of the seating position thereof into a position in which the back side of the backrest means forms a substantially horizontal loading surface which is delimited by the bottom side of the seat cushion means as substantially vertical forward abutment surface, and one pivot arm means on each side of the motor vehicle seat, characterized in that a shaft extending substantially transversely to the vehicle driving direction is rotatably supported in the vehicle underneath the backrest means and to the rear of the seat cushion means, one lever means being non-rotatably arranged on each of the two ends of said shaft said lever means being operable to effect the seat cushion locking, and said pivot arm means being pivotally connected with the lever means at a distance from the axis of rotation of said shaft, said pivot arm means being disengaged out of said detent means during actuation of the lever means.

4,124,251

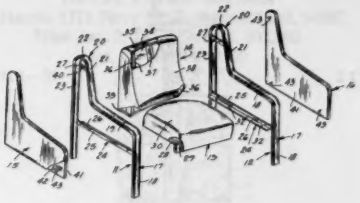
MODULAR FURNITURE CONSTRUCTION

Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division, St. Charles, Ill.

Filed Sep. 20, 1977, Ser. No. 835,017

Int. Cl.[2] A47C *1/12*

U.S. Cl. 297—445 **20 Claims**



1. An article of furniture comprising a pair of laterally spaced tubular metal end frames each having front and rear legs connected by an upright looped back portion and a forwardly extending substantially horizontal portion, an angle strip secured at its ends to the leg portions of each end frame spanning the space between the leg portions below the horizontal portion and having one of its legs projecting toward the other end frame to provide a support ledge, a seat unit spanning the space between the end frames resting on and secured to the ledges of said angle strips, a back unit spanning the space between the end frames resting on and secured to the ledges of said angle strips rearwardly from the seat unit, brackets secured to the upright looped back portion near the top thereof, fasteners securing the upper portions of the back unit to said brackets, and end panel units fitting in the tubular metal end frames secured to said angle strips and brackets.

4,124,252

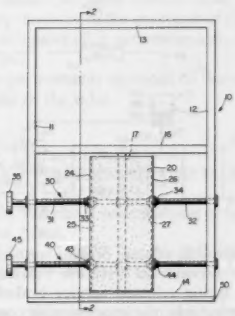
BACK SUPPORT WITH CONTROLLABLE FIRMNESS

Julian R. Safir, 138 Colony Ct. North, Snyder, N.Y. 14206

Filed Jul. 15, 1977, Ser. No. 816,034

Int. Cl.[2] A47C *7/02*

U.S. Cl. 297—452 **16 Claims**



1. A back support for providing selectively controllable firmness for the back of a person comprising:

a pad of compressible, resilient material having a supporting face, against which the back of a person is engageable for support by said pad, said supporting face being bounded at least in part by sides,

means for compressing at least a portion of said pad by moving at least one side towards an opposite side.

4,124,253

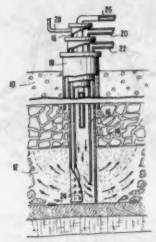
SULFUR WELL SEALING METHOD

Rene L. Latiolais, and Walter W. Hranitzky, both of New Orleans, La., assignors to Freeport Minerals Company, New York, N.Y.

Filed Dec. 21, 1977, Ser. No. 862,779

Int. Cl.[2] E21B *43/28;* E21C *41/14*

U.S. Cl. 299—6 **9 Claims**



1. A method of sealing a sulfur well comprising the steps of:

(a) applying a pressurized gas to the top of a sulfur flow pipe at a pressure sufficiently high to force water in the flow pipe back into the sulfur formation;

(b) holding said pressure for a predetermined amount of time; and

(c) slowly releasing said pressure gas to allow the sulfur flow pipe to return to its normal operating pressure.

4,124,254

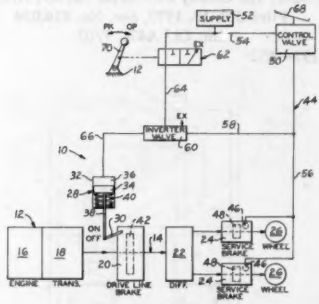
VEHICLE BRAKING SYSTEM

Cullen P. Hart, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 29, 1977, Ser. No. 837,960

Int. Cl.[2] B60T *13/10*

U.S. Cl. 303—2 **7 Claims**



1. In an improved vehicle braking system having a spring engaged and fluid released drive line brake and a pair of fluid engaged and spring released service brakes arranged in the drive line of a vehicle, the improvement comprising:

control means in fluid communication with said drive line brake and said service brakes for controllably applying only said service brakes over a preselected braking force ranged and for thereafter automatically controllably applying said service brakes and said drive line brake in response to a braking force requirement greater than said preselected range.

4,124,255

NOISE REDUCTION DEVICE FOR USE IN THE UNDERCARRIAGE OF TRACK-TYPE VEHICLES

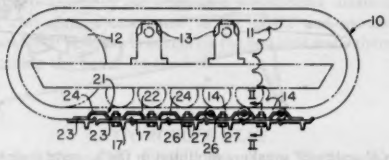
Yoshimasa Kohriyama, Tsukui, Japan, assignor to Caterpillar Mitsubishi Ltd., Tokyo, Japan

Filed Jun. 9, 1977, Ser. No. 804,977

Claims priority, application Japan, Aug. 31, 1976, 51-104070; Aug. 31, 1976, 51-104071

Int. Cl.[2] B62D *55/20*

U.S. Cl. 305—41 **8 Claims**



1. A noise reduction device for a track chain of a track-type vehicle, said track chain having a plurality of links pivotally connected together in an endless train and a plurality of track shoes connected to the links, each track shoe having a backside, said noise reduction device comprising a spring connected to the backside of adjacent shoes and being of a construction sufficient for applying an elastic resistance to pivotal movement of respective pairs of adjoining links, said spring being constructed from a corrugated metal plate spring having concave and convex portions, the direction of the corrugation being transverse to the run of said track chain.

4,124,256

COMBINED RADIAL AND AXIAL BEARING

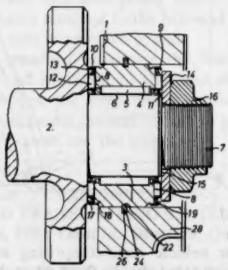
Bernard de Senneville, Neuilly sur Seine, France, assignor to Nadella, Rueil-Malmaison, France

Filed Jan. 28, 1977, Ser. No. 763,640

Claims priority, application France, Jan. 29, 1976, 76 02358

Int. Cl.[2] F16C *19/04*

U.S. Cl. 308—174 **6 Claims**



1. A combined radial and axial bearing assembly comprising a bushing having an inner cylindrical surface forming a race for radial bearing elements, and flat end faces forming races for axial bearings, an outer peripheral surface for mounting in a supporting housing, axial bearing elements engaging said end bearing surfaces, each axial bearing including a cage for said bearing elements, a ferrule for each axial bearing engaging the end of said bushing inwardly of said peripheral surface and extending axially outwardly and radially inwardly from said bushing to form a radial arm, said arm extending over the cage of said axial bearing and retaining said bearing on the race on

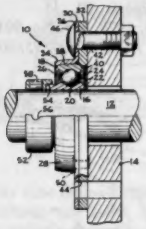
the end of said bushing, said ferrules lying within the outer peripheral surface of said bushing and said bearing faces lying inwardly of said peripheral surface.

4,124,257

BEARING HOUSING

William J. Derner, Indianapolis, and Ronald P. Spalding, Danville, both of Ind., assignors to FMC Corporation, San Jose, Calif.

Filed Aug. 11, 1977, Ser. No. 823,578
Int. Cl.[2] F16C *23/08, 33/00*
U.S. Cl. 308—194 **10 Claims**



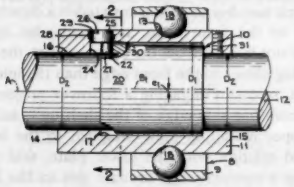
1. In a housing for mounting a bearing entirely on the outside of a wall to support a rotatable shaft that projects perpendicularly through the wall, said housing having a plurality of openings therein for receiving bolts that extend parallel to the shaft and fasten the housing to the wall, said housing having an end cap that can be formed by stamping from thin-stock, said end cap including an axially extending hub and a mounting flange projecting radially outward at one end of the hub, said end cap having an axial bore for receiving a first portion of said bearing, an improvement wherein said housing includes a flat thick plate having a bearing opening therein for receiving in wedging relationship a second portion of the bearing that projects beyond the end cap mounting flange, said plate extending radially outward adjacent the end cap mounting flange and thereby providing radial support for the bearing between the end cap and the wall, said plurality of openings for receiving bolts to fasten the housing to the wall being defined by a plurality of aligned openings in said end cap mounting flange and said plate.

4,124,258

BEARING RING FASTENING ASSEMBLY

Eugene R. Hafner, Carmel, Ind., assignor to FMC Corporation, San Jose, Calif.

Filed Oct. 3, 1977, Ser. No. 839,100
Int. Cl.[2] F16C *33/30*
U.S. Cl. 308—236 **6 Claims**



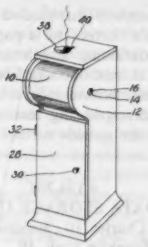
1. An assembly for fastening an inner ring of an anti-friction bearing upon a shaft, said assembly comprising the bearing inner ring having a central bore for receiving the shaft and for maintaining the shaft centric with the ring, said ring having a groove that extends circumferentially about an axially intermediate portion of the bore, said groove having a bottom that is eccentric to the bore, a locking sleeve positioned within said groove, said locking sleeve having an eccentric external contour that fits within said groove when the central axes of the groove bottom and the external sleeve contour are in radial alignment with each other and eccentrically located from the central axis of the bore, said sleeve being split longitudinally to enable the sleeve to be compressed radially, said sleeve having an unstressed bore diameter that is less than the diameter of the shaft, said sleeve being resiliently flexible to receive the shaft and to allow the shaft to slide longitudinally within the sleeve bore, whereby said sleeve inherently grips the shaft, and upon relative rotation between the sleeve and the ring to move the central axes of the groove bottom and the sleeve external contour out of radial alignment with each other from the central axis of the bore, the sleeve wedges within the groove between the ring and the shaft to lock the ring on the shaft.

4,124,259

TOILET PAPER HOLDER

Betty J. Harris, 1721 Ferry St., Anderson, Calif. 96007

Filed Jun. 2, 1977, Ser. No. 802,993
Int. Cl.[2] B65H *19/00*
U.S. Cl. 312—39 **2 Claims**



1. A toilet paper holder comprising

a free-standing portable cabinet having a substantially rectangular base member resting on a floor, a pair of spaced parallel substantially rectangular sides extending perpendicularly upward from the base member, each of the sides having a front edge and a top part having a substantially half disc-shaped projection extending from the front edge with an aperture formed through the axial center of said projection, an open front extending between the front edges of the sides and the base member, a back perpendicular to the sides and the base member and a top perpendicular to the sides and the back;

a door hingedly affixed to one of the sides for selectively opening and closing the open front from the base member to a line beneath the projections of the sides and parallel to the top of the cabinet thereby providing a closable storage space in the cabinet for spare rolls of toilet paper;

a roller rotatably mounted in the apertures of the projections of the sides and extending perpendicularly between said projections; and

a roll of toilet paper rotatably mounted on the roller between the projections of the sides.

4,124,260

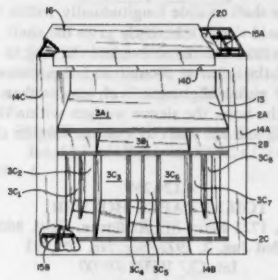
CORRUGATED FIBERBOARD AND FOAMCORE CABINET

Walter G. Bergman, Norwich, Conn., assignor to Scotty Fabricators Inc., Boston, Mass.

Filed Oct. 17, 1977, Ser. No. 842,690
Int. Cl.[2] A47B *43/02, 87/00*
U.S. Cl. 312—107 **21 Claims**

1. An open-front utility cabinet comprising, in combination: a tubular element forming an outer housing, said tubular element being formed of a paper-lined, multilayered medium and having a front opening, with at least one open-front caged-type

module formed of a paper-lined, multilayered medium disposed within and integral with the housing to provide at least one open-front cubicle compartment, the assembled outer housing and the caged-type module structurally interacting as a unitary structure to provide structural integrity for said open-front utility cabinet, said caged-type module comprising



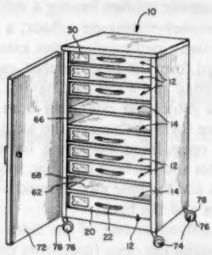
two vertical end members surrounded on the top side, back side, and bottom side thereof by a paper-lined, multilayered medium wrapper containing attachment slots, each vertical end member having at least one attachment flap at each of said top side, back side, and bottom side, which flap is received by and inserted in a corresponding mating slot and folded and adhered securely to the outside surface of said wrapper.

4,124,261

DATA STORAGE UNIT

Gerald R. Klaus, St. Charles, Ill., assignor to Fellowes Manufacturing Company, Franklin Park, Ill.

Filed Mar. 18, 1977, Ser. No. 779,098
Int. Cl.[2] A47B *63/00*
U.S. Cl. 312—183 **7 Claims**



1. A storage unit for computer printout sheets with side pin holes comprising in combination:

at least one compartment including a horizontal bottom wall and an open end;

at least one portable binder for binding said printout sheets to be positioned in said compartment, including a back end, and a first cover and a second cover wherein said back end can face outwardly of the open end of said compartment when said binder is stored in a horizontal position, enclosing the open end of the compartment whereby said printout sheets are stored horizontally; and

wherein said binder includes a handle means mounted on said back end whereby said binders may be slideably removed and replaced, wherein at least one binder includes:

a locking means;

a rigid bar including a plurality of apertures extending the length of the bar;

at least one U-member adapted to be slideably mounted on said bar;

a first strap; and

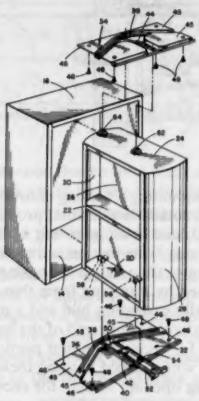
a second strap, said first second straps being each secured to said second cover of said binder and adapted to each be extended through an aperture in said bar and to be secured aligned with said bar by said U-members.

4,124,262

HARDWARE FOR PIVOTING CABINET SHELF

John M. Schill, Kitchner, Canada, assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.

Filed Apr. 28, 1978, Ser. No. 901,226
Int. Cl.[2] A47B *97/00, 95/00*
U.S. Cl. 312—305 **2 Claims**



1. An improved shelf construction comprising, in combination:

a generally rectangular shelf housing having a bottom panel, an opposed top panel and a front edge;

a shelf unit positioned within the housing, said unit comprising a plurality of connected horizontal shelves with a bottom shelf and a top panel in opposed relation respectively with the bottom and top panels of the housing; and

improved hardware for pivotally and reversibly mounting the shelf unit within the housing, said hardware including

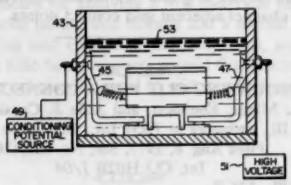
(a) a lower mounting plate attached to the bottom panel of the housing, said mounting plate including a projected surface with a slide support mounted on the surface to define a moving center pivot for a pivot axis member projecting downwardly from the shelf unit whereby the pivot axis member may be translated in a direction perpendicular to the front edge, said plate also including an arcuate slot inward from the slide support, the ends of the slot being closer to the front edge than the mid portion of the slot, said slot engaging a follower projecting downward from one side edge of the shelf unit; and

(b) an upper mounting plate attached to the top panel in opposed relation with the lower plate, said upper plate defining a mirror image arcuate slot to the lower plate arcuate slot and also having a straight follower slot defining a mirror image to the slide support, said top panel of said shelf unit including an upwardly projecting center follower and a side edge follower for cooperation with the arcuate slot and straight slide respectively; whereby the shelf unit is pivotal about the center follower and pivot member and the side edge followers are movable from one side of the arcuate slot to the other to thereby reverse the shelf unit.

4,124,263
PROCESS FOR HIGH VOLTAGE CONDITIONING CATHODE RAY TUBES

Ralph E. Neuber, and Charles H. Rehkopf, both of Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 796,744, May 13, 1977. This application Mar. 13, 1978, Ser. No. 885,740
Int. Cl.[2] H01J *9/00, 9/44*
U.S. Cl. 316—1 7 Claims



1. A cathode ray tube high voltage conditioning process for conveyorized cathode ray tubes having an electrode connected to a high voltage source and internal electrodes connected to external base pins with the internal electrodes having a resistance to arcing therebetween greater than the resistance to arcing between said base pins, said process comprising the steps of:

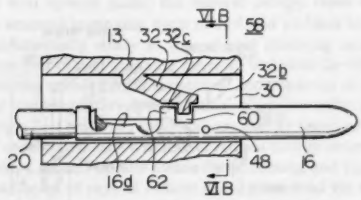
moving a cathode ray tube having external base pins connected to internal electrodes and a first container having a pair of electrical contacts therein and passing therethrough to a high voltage and a pulsed conditioning potential source and containing a liquid with a dielectric strength greater than the dielectric strength of air to effect immersion of said base pins in said liquid and selective coupling of said base pins to said pair of electrical contacts; and

moving said cathode ray tube and a second container having a pair of electrical contacts therein and passing therethrough to a common reference potential source to effect coupling of said base pins and said electrical contacts whereby said indexed first container effects arcing intermediate adjacent internal electrodes and said indexed second container effects arcing intermediate all of said internal electrodes in common and said electrode connected to said high voltage source.

4,124,264
ELECTRIC PLUG ASSEMBLY

Shinichi Kato; Kiyoto Watanabe, both of Yokohama, and Shuichi Otani, Tokyo, all of Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Mar. 31, 1977, Ser. No. 783,392
Claims priority, application Japan, Apr. 5, 1976, 51-41761
Int. Cl.[2] H01R *13/42*
U.S. Cl. 339—59 M 1 Claim



1. An electric plug comprising:

a base member having therein parallel first and second through passages which are merged with each other, a surface portion defining said second through passage being formed with a pair of elongate notches which extend substantially parallel to the axis of said second through passage from one extreme end of said second through passage to a portion of said surface portion near the other extreme end of said second through passage;

a resilient tongue member integrally connected to a surface defining said first through passage so as to project the free end thereof into said first through passage, said free end of said resilient tongue member being formed into a catch portion which has a pair of spaced parallel recesses extending substantially parallel to the longitudinal axis of said first through passage;

a contact making pin member having therein a caught portion which is engageable with said catch portion of said resilient tongue member, said pin member being adapted to be inserted into said second through passage for the connection therebetween;

a pair of guide plate portions formed on said pin member;

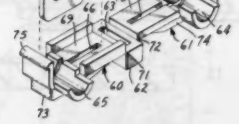
a pair of projections provided on a surface of said pin member to radially outwardly extend from the same;

the connection of said pin member with said base member made such that upon final fitting of said pin member to said base member, said catch portion catches said caught portion to prevent said pin member from a longitudinal movement toward said one extreme end of said second through passage, said pair of guide plate portions are respectively received in said parallel recesses of said tongue member for preventing said pin member from rotational and pendulous movements thereof about the axis thereof with respect to said second through passage, and said pair of projections are respectively received in said elongate notches at said portion near said surface portion near the other extreme end of said second through passage thereby to prevent said pin member from a longitudinal movement toward the other extreme end of said second through passage.

4,124,265
QUICK SLIDE CONNECTOR

Frederick J. Turk, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Nov. 10, 1977, Ser. No. 850,300
Int. Cl.[2] H01R *11/20*
U.S. Cl. 339—97 R 4 Claims



1. A solderless electrical connector for making permanent electrical contact with an insulated wire and quick connect electrical contact with a male blade conductor comprising at least one planar electrically conductive contact element and an insulative body member,

said planar element having a U-shaped spring reserve wire contact slot defined by substantially parallel edges including an area where said edges smoothly diverge forming a wire receiving and insulation displacing mouth,

said planar element further includes a bifurcated portion forming a pair of arms, said arms having opposed edges defining a blade receiving slot,

said blade receiving slot having an area of diminished cross-section such that a blade terminal inserted into said blade

receiving slot is resiliently contacted at the area of diminished cross-section by said arms,

said insulative body member is formed as an upper and lower body portion, first and second wire receiving channels are formed in the upper and lower body portions respectively, which form a tubular wire receiving channel when the upper and lower body portions are placed in the closed position,

said upper and lower body portions having channels transverse to said wire receiving channels for accepting and retaining said planar element and permitting the same to be driven into insulation penetrating and resiliently loaded wire contacting engagement with a wire lying in said wire receiving channel formed in said lower body portion,

said upper and lower body portions also having planar blade support areas for aligning and supporting said male blade conductor when said male blade conductor is driven into engagement with said bifurcated portion of said planar element,

said upper and lower body portions also forming an entry slot for receiving said male blade conductor, and

retaining means for securing said upper and lower body portions in the closed position.

4,124,266

ELECTRICAL CONNECTING MEANS

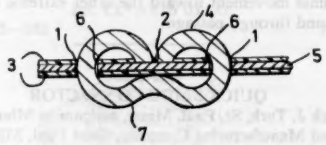
John B. Wagstaff, Newtown Linford, England, assignor to Pressac Limited, Long Eaton, England

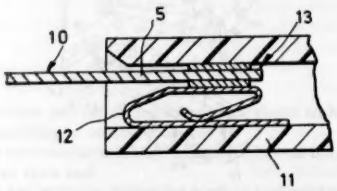
Filed Jun. 15, 1977, Ser. No. 806,710

Claims priority, application United Kingdom, Jun. 18, 1976, 25341/76

Int. Cl.[2] H01R *11/20*

U.S. Cl. 339—97 C **6 Claims**





1. Connecting means comprising:

(a) an elongated first strip of electrically conductive material having two opposite longitudinal faces;

(b) a layer of insulating material covering each of said faces;

(c) a crimpable second strip of flexible, resilient, electrically conductive material having two end portions,

(1) said second strip piercing said first strip and said layers of insulating material at two longitudinally spaced points of said first strip in electrical contact with the material of said first strip,

(2) two end portions of said second strip projecting from one of said layers at said two points respectively, and a portion of said second strip intermediate said end portions being superposed on the other one of said layers,

(3) said two end portions being directed toward each other and having respective terminal parts penetrating said one layer and making additional electrical contact with said first strip;

(d) a socket member bounding a cavity therein; and

(e) a contact element in said cavity,

(1) said second strip and the portion of said first strip pierced by said second strip being releasably received in said cavity,

(2) said second strip and said socket member engaging each other in electrical contact in at least two contact points,

(3) said second strip and said socket member bounding an air channel adjacent said contact points.

4,124,267

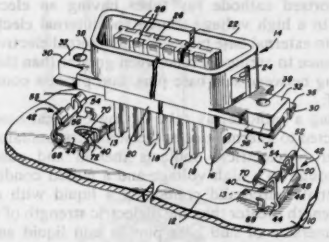
MOUNTING CLIP FOR A CONNECTOR

Gordon L. Mines, Elmhurst, and Aldo J. Consiglio, Chicago, both of Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Filed Aug. 8, 1977, Ser. No. 822,426

Int. Cl.[2] H02B *1/04*

U.S. Cl. 339—125 R **12 Claims**



1. A mounting clip for securing a connector to a chassis, comprising a base; a wall portion connected to said base along one base edge and having at least one terminal portion in superposed spaced relation to said base; opposed guide means formed with opposed edges of said base separated by said one base edge and extending in the same direction therefrom as said wall portion; said wall portion being resiliently movable relative to said base and having a segment cut therefrom and bent away from said clip base portion, said segment being formed from a clip wall portion adjacent said wall terminal portion.

4,124,268

OPTICAL DEVICE FOR THE STORAGE AND THE SELECTIVE ERASURE OF INFORMATION

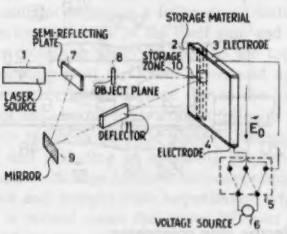
Francois Micheron, and Jean Pierre Huignard, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jul. 13, 1976, Ser. No. 704,979

Claims priority, application France, Jul. 17, 1975, 75 22354

Int. Cl.[2] G02B *27/00*

U.S. Cl. 350—3.63 **4 Claims**



1. An optical device for the storage and the selective erasure of information comprising:

a photoconductive electro-optical storage material, said material having a symmetrical electrooptical characteristic;

optical means which, for the storage, ensure the photoexcitation of a zone of said material by a network of interference fringes, said photoexcitation photoinducing an elementary hologram in said zone for the read-out of said elementary hologram, provide the illumination of said zone by a beam of monochromatic light and for the selective erasure of said elementary hologram, ensure the photo-excitation of said zone by the same network; and

polarizing means for applying a first electrical field within said material during said storage and a second electrical field during said erasure of the same zone, said second electrical field being opposite to said first electrical field, said fields being orthogonal to said interference fringes.

4,124,269

SCANNING SYSTEM WITH IMPROVED RADIATION ENERGY COLLECTING CAPABILITIES

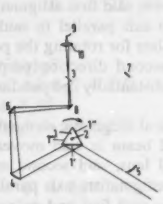
Leo H. J. F. Beckmann, Delft, Netherlands, assignor to N.V. Optische Industrie "De Oude Delft", Delft, Netherlands

Continuation-in-part of Ser. No. 652,722, Feb. 3, 1976, abandoned. This application Feb. 9, 1977, Ser. No. 766,957

Claims priority, application Netherlands, Feb. 3, 1975, 7501243

Int. Cl.[2] G02B *27/17*

U.S. Cl. 350—6.8 **11 Claims**



1. A radiant energy scanning system for scanning an area disposed to one side of said system comprising an optical scanning mirror having at least three reflective surfaces extending parallel to the longitudinal axis of said mirror, means for rotating said scanning mirror around said longitudinal axis through scanning intervals during which said surfaces are sequentially directed toward and receive impinging radiant energy from said scanned area, a radiant energy detector arrangement for converting radiant energy reflected from said scanning mirror into corresponding signals, an optical system for establishing two separate optical paths to said detector arrangement including two receiving means operatively positioned relative to the scanning mirror for sequentially directing the radiant energy reflected from said surfaces during a single scanning interval along said two optical paths, the radiant energy from said entire area scanned impinging upon one of said surfaces being reflected substantially solely to one of said receiving means during a first half of said scanning interval, and onto the other of said receiving means during the second and consecutive half of the same scanning interval, first optical means for collecting and focusing a first beam of rays of radiant energy received via one of said receiving means within said radiant energy detector arrangement, a second optical means for collecting and focusing a second beam of rays of radiant energy received via said other of the receiving means within said radiant detector arrangement, and optical switch means synchronously coupled to said scanning mirror for alternately allowing said first beam and said second beam, respectively, to impinge on said radiant energy detector arrangement.

4,124,270

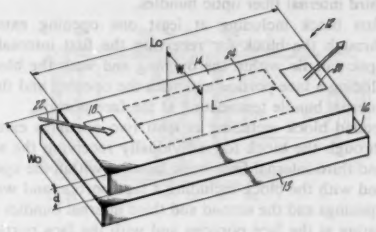
MONOLITHIC, THREE-DIMENSIONAL INFRARED WAVEGUIDE FOR HIGH POWER LASERS

Peter K. Cheo, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 30, 1977, Ser. No. 782,857

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.12 **18 Claims**



1. A thin-film optical waveguide for providing guided mode propagation of an infrared laser, comprising:

a monolithic, solid material planar structure of determined length and width having two mutually opposed, parallel major surfaces, and including a guided laser propagation path extending along a central portion of the longitudinal axis of the structure between said major surfaces, said monolithic structure having a material thickness in the region of the guided propagation path which is dependent on the wavelength of the infrared laser;

optical couplers, one each disposed at opposite ends of a first one of said major surfaces for optically coupling the laser beam through said guided laser propagation path; and

a metallic base, disposed on a second one of said major surfaces for providing dissipation of the laser signal power within said structure.

4,124,271

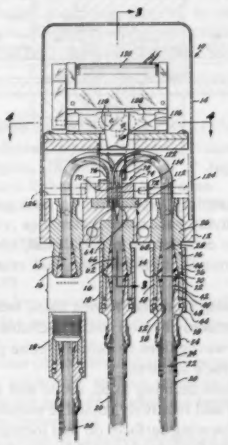
FIBER OPTIC SWITCH AND CONNECTOR

William F. Green, Woodland Hills, Calif., assignor to Transco Products, Inc., Venice, Calif.

Filed Mar. 14, 1977, Ser. No. 777,087

Int. Cl.[2] G02B *5/16*

U.S. Cl. 350—96.20 **21 Claims**



1. A fiber optic switch for switching light energy from a first

input bundle of optic fibers to one of at least two output bundles of optic fibers, including,

a first fiber optic connector for receiving and transmitting the light energy transmitted from the first input bundle of optic fibers to a first internal fiber optic bundle,

second and third fiber optic connectors for receiving and transmitting the light energy transmitted to one of the at least two output bundles of optic fibers to second and third internal fiber optic bundles,

a first block including at least one opening extending through the block for receiving the first internal fiber optic bundle within the opening and with the block including a face portion and with the opening and the first internal bundle terminating at the face portion,

a second block including at least two openings extending through the block for individually receiving the second and third internal fiber optic bundles within the openings and with the block including a face portion and with the openings and the second and third internal bundles terminating at the face portions and with the face portions of the first and second blocks contiguous to and in sliding engagement with each other,

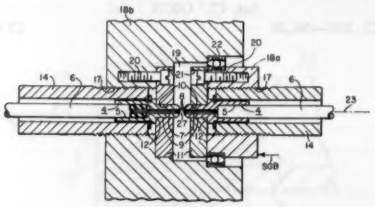
means for providing relative movement between the first and second blocks to at least two positions and with the first and second internal bundles aligned to transfer light energy between the first and second internal bundles in the first position and the first and third internal bundles aligned to transfer light energy between the first and third internal bundles in the second position.

4,124,272

ROTARY FIBER OPTIC WAVEGUIDE COUPLING

James A. Henderson, Finksburg, and Pamela D. Oliver, Laurel, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 750,473, Dec. 14, 1976, abandoned.
This application Jan. 12, 1978, Ser. No. 868,790
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.21 **8 Claims**



1. A rotary coupling for fiber optic waveguide comprising,

a pair of relatively rotatable members,

bearing means establishing precise axial, radial and angular rotary interconnection between said relatively rotatable members,

a pair of locating members having axial, radial, and angular locating surfaces thereon and attachable to the ends of fiber optic waveguides to define precise positions thereof relative to such surfaces,

alignment means defining axial, radial and angular locating surfaces on said relatively rotatable members complementary to the locating surfaces on said locating members, and

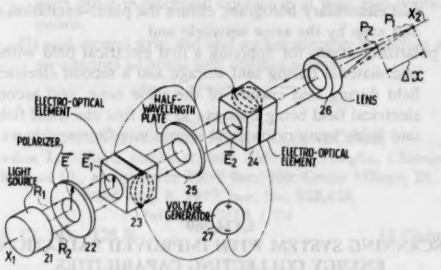
retaining means for retaining said locating members on said relatively rotatable members, respectively, in complementary locating surface cooperation.

4,124,273

VARIABLE VERGENCY FOCUSSING APPARATUS

Jean-Pierre Huignard, and Claude Puech, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Oct. 22, 1976, Ser. No. 734,974
Claims priority, application France, Oct. 28, 1975, 75 32931
Int. Cl.[2] G02F *1/29*; G11B *7/08*
U.S. Cl. 350—150 **9 Claims**



1. A variable vergency apparatus for focussing an incoming light beam having a beam axis and being polarized along a first direction perpendicular to said beam axis, in a point moveable along said beam axis, said apparatus comprising:

a first electro-optical astigmatic element for first focussing said incoming beam alike a first cylindrical lens delivering a first focussed beam; said first astigmatic element having a first astigmatism axis parallel to said first direction; a half-wavelength plate for rotating the polarization of said light beam to a second direction perpendicular to said beam axis and substantially perpendicular to said first direction;

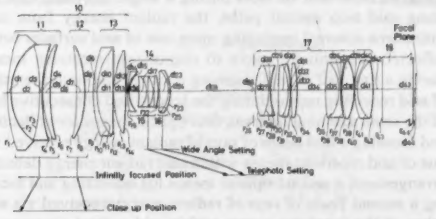
a second electro-optical astigmatic element for second focussing said focussed beam in said moveable point alike a second cylindrical lens; said second astigmatic element having a second astigmatism axis parallel to said second direction, whereby said first and second focussing combines themselves for focussing said incoming beam alike a single spherical lens; and control means for providing to said first and second electro-optical astigmatic elements control voltages for controlling said first and second focussing.

4,124,274

ZOOM LENS HAVING CLOSEUP FOCUSING CONTROL

Kazuo Tanaka, and Kunio Takeshi, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1977, Ser. No. 761,960
Claims priority, application Japan, Jan. 28, 1976, 51-8096
Int. Cl.[2] G02B *15/18*
U.S. Cl. 350—184 **7 Claims**



1. A zoom lens comprising:

a focusing lens part consisting of a front movable lens group, an intermediate movable lens group and a fixed lens group arranged in this order from the front;

a zooming part being positioned on the image side of said focusing lens part and consisting of a variation lens group and a compensation lens group; and

an image forming lens being positioned on the image side of said zooming part;

whereby, letting f_1 denote the focal length of the front movable lens group, and f_2 the focal length of the intermediate movable lens group, and with the positions which the front and intermediate movable lens groups occupy when focused to infinity regarded as reference positions, letting a denote the distance from the principal point of the front movable lens group located in the reference position to an object, and d the interval between the secondary principal point of the front movable lens group in the reference position and the primary principal point of the intermediate movable lens group in the reference position; as the two movable lens groups are moved to effect focusing for an object, letting S denote the amount of movement of the front movable lens group from the reference position and t the amount of movement of the intermediate movable lens group from the reference position, the movement amount S and the movement amount t satisfy the following relation:

$$t = -\frac{Y}{2X}\left(1 - \sqrt{1 - \frac{4 \times Z}{Y^2}}\right)$$

wherein

$X = CF\phi_2 - C\phi_1\phi_2 S$

$Y = -AF\phi_2 + A\phi_1\phi_2 S + CF - C\phi_1 S - CG + C^2 S - CF\phi_2 S + C\phi_1\phi_2 S^2$

$Z = AG + AF\phi_2 S - A\phi_1\phi_2 S^2 - EC - CFS + C\phi_1 S^2$

$A = 1 - \phi_1 d$

$B = -d$

$C = -\phi_1\phi_2 d + \phi_1 + \phi_2$

$D = 1 - d\phi_2$

$E = a \cdot A + B$

$F = a\phi_1 + 1$

$G = aC + D$

$\phi_1 = 1/F_1$, $\phi_2 = 1/f_2$.

2. A zoom lens comprising:

a front lens group comprising first, second and third subgroups in this order and having a positive refracting power;

an image forming lens group; and

a zooming part including a plurality of movable lens groups for zooming and arranged between said front lens group and said image forming lens group; said second sub-group having a positive refracting power, moving toward the image when focusing from infinity to a finite distance and having a magnifying power within a moving range, said first sub-group having a negative refracting power and being movable independently of said first sub-group.

5. A zoom lens comprising:

a front sub-group which is movable at the time of focusing;

an intermediate movable sub-group which moves in a direction contrary to said front sub-group at the time of focusing, having a magnifying power to an object image of said front sub-group within its movable range, and is arranged closer to the image side than said front sub-group;

a rear sub-group which is fixed at the time of focusing and is arranged on the image side of said intermediate sub-group;

a zooming part including a plurality of lens groups movable for zooming, and being arranged on the image side of said rear sub-group; and

an image forming lens group being arranged closer to the image side than said zooming part.

4,124,275

COMPACT VARIFOCAL LENS ASSEMBLY

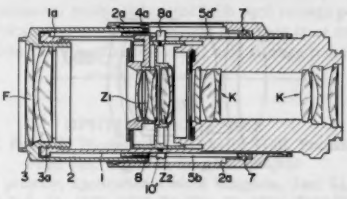
Kyozo Uesugi, Osaka, apan, assignor to Minolta Camera Kabushiki Kaisha, Osaka-fu, apan

Filed Dec. 18, 1972, Ser. No. 315,828

Claims priority, application apan, Dec. 31, 1971, 47-2419

Int. Cl. G02b *7/10*

U.S. Cl. 350—187 **9 Claims**



1. A varifocal lens assembly, wherein zoom is controlled by one movement, preferably axial and focus is controlled by another movement, preferably rotation, for use in association with photographic, motion picture and television cameras, comprising: an objective mounting; means including a first mounting rotatably carried by said objective mounting for rotary motion, said means thereby moving in the axial direction in relation to said objective mounting for focusing adjustment; means including a second mounting operatively positioned and axially movable in relation to said objective mounting for adjustment of the focal length; means including a third objective mounting axially operatively positioned to and reciprocable in relation to said second mentioned means for permitting the picture image appearing in the field of view of an observer or photographer to remain in focus at all times during the axial movement of said second mentioned means; an actuating member mounted on said objective mounting and accessible to the photographer or operator of the varifocal lens assembly for independent or simultaneous rotary and axial movement thereof; first guide means connected between said actuating member and said first mounting for permitting said first mentioned means to undergo rotary and axial sliding motion in accordance with the rotary motion of said actuating member; linkage means connected between said actuating member and said second mounting for transmitting only the axial sliding motion of said actuating member to said second mounting; and second guide means connected between said second mounting and said third mounting for transmitting the axial sliding motion of said second mounting thereby to permit said third mentioned means to undergo said reciprocal movement in relation to said second mentioned means.

4,124,276

SOFT FOCUS LENS SYSTEM

Yukio Okano, Minamikawachi; Akiyoshi Nakamura, Sakai, and Toshinobu Ogura, Tondubayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Dec. 15, 1976, Ser. No. 750,824

Claims priority, application Japan, Dec. 22, 1975, 50/154540; Sep. 10, 1976, 51/109281

Int. Cl.[2] G02B *13/20*

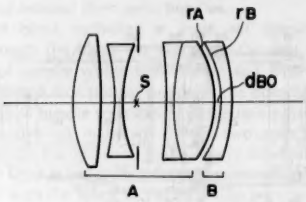
U.S. Cl. 350—188 **22 Claims**

1. A soft focus lens system having an optical axis and a point of intersection for an off-axial principal ray with the optical axis comprising:

a first lens group of positive refractive power having a first image side refracting surface concave to the point of intersection, the point of intersection being located within the first lens group; and

a second lens group of negative refractive power located at the image side of the first lens group and having a second object side refracting surface adjacent to the first image side refracting surface to form a meniscus-shaped air space

between the first and second refractive surfaces, the radius of curvature, r_A, of the first retracting surface and the radius of curvature, r_B, of the second refracting surface having values defined within the following ranges, respectively, wherein the focal length of the lens system is represented by f:



$$0.20 < |r_A|/f < 0.65 \quad (1)$$

$$0.18 < |r_B|/f < 0.45 \quad (2)$$

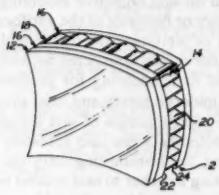
whereby an optimum degree of spherical aberration can be introduced into a transmitted image to provide a soft focus image.

4,124,277

PARABOLIC MIRROR CONSTRUCTION

Donald A. Stang, Littleton, Colo., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Feb. 16, 1977, Ser. No. 768,977
Int. Cl.² G02B 5/10
U.S. Cl. 350—310 **21 Claims**



1. A multi-layer rigid panel having a facing layer formed by a stiff sheet of rigid reflective material, said stiff sheet of rigid material being held in a smoothly curved configuration under bending stress within its elastic limit by a holding layer of material bonded to said sheet or rigid material and preventing relaxation of said bending stress, said holding layer being substantially dimensionally stable in response to the stress imparted thereto by said bending stress in said facing layer to maintain said reflective facing layer in said smoothly curved configuration.

4,124,278

OPTICAL SUBTRACTION OF IMAGES IN REAL TIME

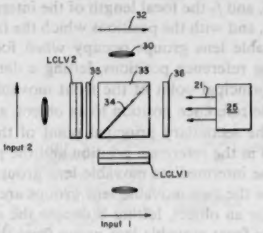
Jan Grinberg, Los Angeles, and Emanuel Marom, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Jun. 22, 1977, Ser. No. 808,941
Int. Cl.² G02F 1/13
U.S. Cl. 350—342 **13 Claims**

1. A system for optical subtraction of two images comprising:

(a) means for superposing a normal function of the spatial intensity distribution of one of said images on a complementary function of the spatial intensity distribution of the other of said images to produce a resulting image which displays both the sign and magnitude of the difference of the spatial intensity distributions of said images;

(b) said normal function having the optical characteristics of a polarized light image modulated by a birefringent modulating device positioned between crossed polarizers; and



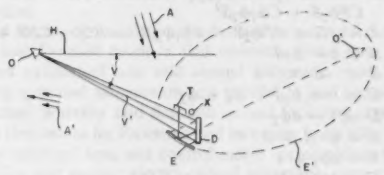
(c) said complementary function having the optical characteristics of a polarized light image modulated by a birefringent modulating device positioned between parallel polarizers.

4,124,279

REFLECTOR FOCUSED LIGHT TRAP FOR A LIQUID CRYSTAL DISPLAY

William R. Byles, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Jul. 18, 1977, Ser. No. 816,249
Int. Cl.² G02F 1/13
U.S. Cl. 350—345 **8 Claims**



1. In combination with a reflective electro-optical display device:

a. a light trap;

b. mirror means for simultaneously projecting an image of said light trap onto said device and for supplying light to said device for off-state reflection from said device in a first direction; and

c. means associated with said display device for selectively deflecting light reflected from said display device away from said first direction and towards a viewing direction in the on-state of said device.

4,124,280

ACOUSTIC-OPTIC TECHNIQUE FOR PROCESSING MANY SIGNALS SIMULTANEOUSLY

Norman J. Berg, Baltimore, Md., and James T. Karam, Jr., Reston, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

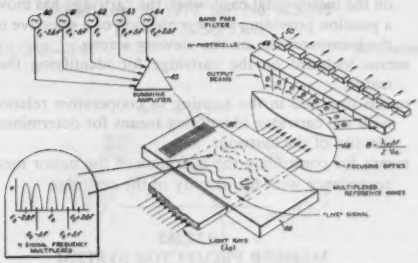
Filed Jun. 7, 1977, Ser. No. 804,202
Int. Cl.² G02F 1/32
U.S. Cl. 350—358 **3 Claims**

1. An acousto-optic apparatus for processing first and second sets of composite signals and for obtaining the correlation of the envelope for each composite signal in said first set with the envelope of a respective composite signal in said second set, comprising,

a piezoelectric crystal having said second set of composite signals stored therein as respective overlapping index of

refraction variation patterns over a given surface area of said crystal, each of said stored composite signals being comprised of an R.F. signal modulated by an envelope, with the R.F. frequency of each composite signal in said second set being different from the R.F. frequency of each other signal in said set, said crystal having acoustic transducer means disposed thereon to one side of said given surface area for converting electrical signals which are applied thereto to corresponding acoustic signals,

said first set of composite signals comprising a set of electrical signals, each of said electrical signals being comprised



of an R.F. signal modulated by an envelope, with the R.F. frequency of each composite signal in said first set being different from the R.F. frequency of each other signal in said set of said first set being the same as the R.F. frequency of one signal of said second set of signals,

means for applying said first set of composite signals to said acoustic transducer means,

laser means directed to transmit a laser beam across said given surface area and

detector means for detecting said laser beam after it traverses said surface portion.

4,124,281

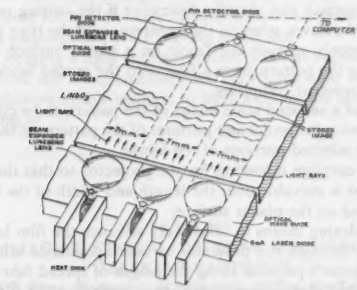
SCHEME FOR TERMINAL GUIDANCE UTILIZING ACOUSTO-OPTIC CORRELATOR

Norman J. Berg, Baltimore, and Burton J. Udelson, Bethesda, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 7, 1977, Ser. No. 804,204

Int. Cl.² G02F *1/32*

U.S. Cl. 350—358 **5 Claims**



1. An acousto-optic correlation device for use in a terminal guidance system for guiding a vehicle to a target area, comprising

an elongated acousto-optic crystal having a plurality of storage positions along its length, each storage position corresponding to a one dimensional strip of said target area, each storage area having a signal stored therein as an index of refraction variation pattern, each stored signal corresponding to the variation of a characteristic parameter such as reflectivity of the target area strip which corresponds to the storage position,

means for sequentially propagating real time acoustic signals across all of said stored signals, said real time signals corresponding to the variation of said characteristic parameter of one dimensional strips of the scene actually being viewed by said vehicle,

laser means irradiating said storage positions, and,

a photodetector means associated with each storage position and located so that the laser light from said laser means is incident thereon after traversing said storage positions.

4,124,282

OPHTHALMIC LENSES

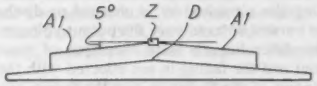
Sydney J. Bush, 37 Westella Rd., Kirkella, Hull, England

Filed Jun. 11, 1976, Ser. No. 694,924

Claims priority, application United Kingdom, Jun. 13, 1975, 25448/75; Feb. 11, 1976, 5476/76; Feb. 23, 1976, 7106/76; Feb. 24, 1976, 7309/76

Int. Cl.² G02C *7/06*

U.S. Cl. 351—168 **3 Claims**



1. An ophthalmic lens comprising upper and lower lens portions which respectively comprise upper and lower lens surfaces which are angularly displaced relative to one another about a horizontal axis so that the optical centers of said lens portions are correspondingly vertically displaced and the lens exhibits a prismatic effect, said upper and lower lens surfaces being joined by a transverse band providing a smooth transition between them, said band having a vertical dimension greater than 3 mm.

4,124,283

FADE-IN AND FADE-OUT DEVICE OF AN AUTOMATIC SERVOMECHANISM OF DIAPHRAGM IN A CINECAMERA

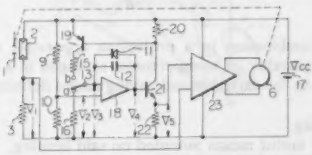
Yasuo Shigeru, and Tomio Kurosu, both of Tokyo, Japan, assignors to Copal Company Limited, Tokyo, Japan

Filed May 13, 1977, Ser. No. 796,596

Claims priority, application Japan, May 14, 1976, 51-54339

Int. Cl.² G03B *21/36*

U.S. Cl. 352—91 C **10 Claims**



1. Fade-in and fade-out device of an automatic servomechanism of diaphragm in a cinecamera having a scene light indicating voltage generating circuit including a photoelectric element located behind the objective lens diaphragm or a diaphragm coupled therewith so as to receive scene light therethrough, a reference voltage generating circuit, a control circuit adapted to receive the output voltages of both the voltage generating circuits so as to control the diaphragm, the diaphragm being actuated in response to the voltage differential between the output voltages of both the voltage generating circuits until both the output voltages are made equal to each

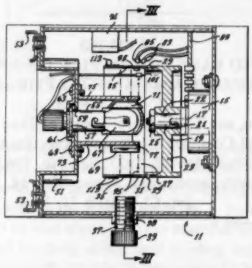
other thereby achieving the proper exposure, a switch, a constant current charging circuit and a constant current discharging circuit, the charging circuit being selectively connectable to the reference voltage generating circuit by the actuation of the switch so as to raise the output voltage thereof to a predetermined value while the discharging circuit is selectively connectable to the reference voltage generating circuit by the actuation of the switch so as to lower the output voltage of the reference voltage generating circuit from the predetermined value to the output reference voltage initially set to the reference voltage generating circuit thereby permitting the fading-out and the fading-in to be effected, the improvement wherein the reference voltage generating circuit is constituted by a voltage dividing circuit consisting of a pair of resistors connected in series to each other, an operational amplifier having its non-inverted input terminal connected to the output terminal of the voltage dividing circuit and its output terminal connected to the control circuit, a capacitor and a diode connected in parallel to each other, the parallel circuit of the capacitor and the diode being connected between the output terminal and the inverted input terminal of the operational amplifier so as to form a negative feedback circuit thereof, and the charging circuit and the discharging circuit are constituted by resistance means selectively connectable to the inverted input terminal of the operational amplifier by the actuation of the switch thereby permitting the capacitor to be charged or discharged with a constant current so as to vary the output voltage of the operational amplifier linearly with the lapse of time so that the fading-out and the fading-in are effected with the exposure at the midpoint of the fading-in and the fading-out being made equal to each other.

4,124,284

MULTIPLE IMAGE PROJECTION DEVICE

Erick Schumacher, Sepulveda, Calif., assignor to Industrial Electronic Engineers, Inc., Van Nuys, Calif.

Filed Sep. 27, 1976, Ser. No. 727,029
Int. Cl.[2] G03B *23/10*
U.S. Cl. 353—25 **23 Claims**



1. In combination in a projection apparatus, a cartridge having a plurality of transparencies arranged in a continuous sequence on the cartridge and having means defining a starting position,

a housing,

stepper motor means mounted on said housing,

means mounted on said housing for rotation by said stepper motor including

cartridge carrier means operably connected to said motor for carrying the cartridge for rotation with the stepper motor means,

means in said housing for providing a projection light source to illuminate individual ones of said transparencies on the cartridge,

means on said housing for focusing light from said source onto individual ones of said transparencies,

means on said housing for defining a viewing screen,

means on said housing for projecting the image formed by the illumination of individual ones of said transparencies on the viewing screen,

means for initially providing an operation of the motor means to move the cartridge to the starting position,

means for producing a control signal indicating the movement of the cartridge to the starting position,

means responsive to the production of the control signal for continuing the operation of the motor means on an incremental basis from the starting position,

means responsive to the operation of the motor means on an incremental basis from the starting position for subsequently discontinuing the operation of the motor means on the incremental basis when the cartridge has moved to a position providing for a projection of a selective one of the transparencies on the viewing screen,

means included on the cartridge for identifying the cartridge,

means disposed in the housing in cooperative relationship with the cartridge identifying means for determining the identity of the cartridge, and

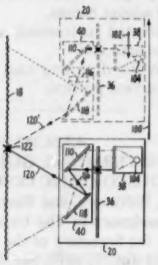
means for controlling the operation of the motor means in accordance with the identity of the cartridge.

4,124,285

MARKER PROJECTOR SYSTEM

Gerald L. Johnson; Joe T. Huff, both of Garland, and Weldon A. Sanders, Jr., Seagoville, all of, TX, assignors to Levi Strauss & Co., San Francisco, Calif.

Filed May 23, 1977, Ser. No. 799,216
Int. Cl.[2] A41L *3/00*; G03B *21/26*
U.S. Cl. 353—28 **4 Claims**



1. Improved apparatus for correlating the position of fabric flaws with the location of a cutting pattern for the fabric so that an operator can visually determine if the cutting pattern overlaps the flaws, wherein the apparatus is of the type which simultaneously spreads the fabric on a planar surface while projecting the pattern from a film onto the spread fabric and the improvement comprises:

a film of a reduced scale image of the pattern to be cut out;

a projector for projecting portions of the pattern on the film onto selected portions of the fabric;

an *x–y* carriage mounting for the projector so that the projector is movable over the length and width of the fabric spread on the planar surface;

film indexing means to selectively advance the film lengthwise through the projector in correspondence with the projector's position along the length of spread fabric;

a gear and slide assembly for interconnecting the film and projector relative to the *x–y* carriage so that as the projector and film are moved across the width of the fabric in one direction and at a first velocity the gear assembly moves the projector relative to the film in the opposite direction and at a second velocity which has the same ratio to the first velocity as the scale of the film image pattern has to the actual size pattern; with the resulting effect being that the portions of the pattern on the film

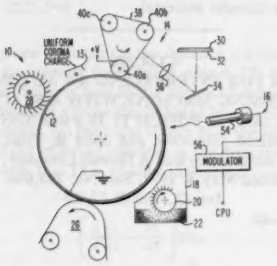
which are projected onto the fabric appear to the operator to have a fixed position relative to the fabric.

4,124,286

METHOD AND APPARATUS FOR XEROGRAPHICALLY PRINTING A COMPOSITE RECORD OF FIXED AND VARIABLE DATA

Stephen Barasch, Southfield, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Aug. 18, 1977, Ser. No. 825,592
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—3 R **20 Claims**



4. An improved xerographic printing process of the class wherein a latent electrostatic image is formed on an electrically insulative surface, developed, and transferred onto a record medium, the improved process being characterized in that it provides the capability of forming a latent, electrostatic image derived from first and second complementary sources of information, the improved process including the steps of:

(a) imaging a light pattern representative of the information from the first source onto a first photoreceptive medium, the first photoreceptive medium being formed of an electrically conductive base layer and a photoconductive receiving layer having the property of persistent conductivity, to form a conductive image of the information from the first source;

(b) transferring and transforming the conductive image from the first photoreceptive medium onto a second photoreceptive medium in the form of an electrostatic image of the conductive image, the second photoreceptive medium being formed of an electrically conductive base layer and a photoconductive receiving layer; and

(c) imaging a light pattern representative of the information from the complementary second source onto the second photoreceptive medium to form a composite electrostatic image.

4,124,287

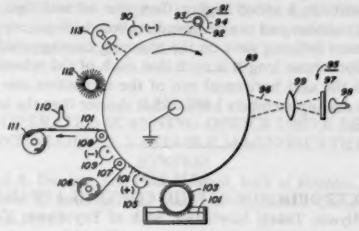
IMAGING SYSTEM UTILIZING UNCHARGED MARKING PARTICLES

Lloyd F. Bean, Rochester, and Roger L. Miller, Penfield, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 31, 1977, Ser. No. 783,095
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—3 R **16 Claims**

1. An apparatus for producing a visible image on a photoconductive imaging surface which comprises:

(a) a means for forming an imagewise non-uniform charge pattern having an average strength of at least about 100 volts on a photoconductive surface having a thickness of at least about 1.25 microns; and



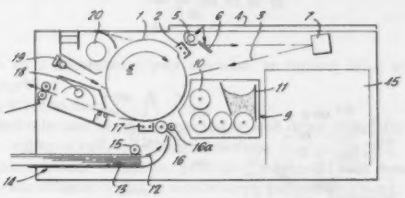
(b) a means for contacting the surface with finely divided uncharged marking particles having a dielectric constant of at least about 1.5 more than the surrounding medium.

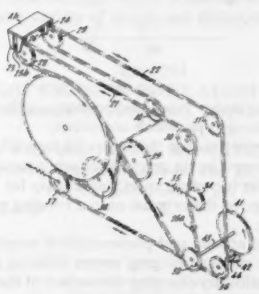
4,124,288

SCANNING MECHANISM FOR AN ELECTROSTATIC COPIER

Karl G. Zeuthen, Gentofte, Denmark, assignor to Rex-Rotary International Corporation A.S., Birkerod, Denmark

Filed Jan. 14, 1977, Ser. No. 759,479
Claims priority, application United Kingdom, Jan. 19, 1976, 2016/76
Int. Cl.[2] G03G *15/28, 15/32*
U.S. Cl. 355—8 **11 Claims**





1. A document copier comprising a platen for supporting an original document to be copied, a scanning carriage mounted to move along a path to define a scan of an original on said platen; first and second endless driving members for driving said scanning carriage along said path; a pair of wheels entraining a respective one of said endless driving members to extend along a horizontal run parallel to said path of the scanning carriage; at least one drive member carried by each endless driving member; means on said scanning carriage defining two slots each adapted to receive a drive member carried by a respective one of said endless driving members; means driving said first endless driving member for constantly circulating

motion giving travel along said horizontal run in a forward direction during a copy cycle; and means driving said second endless driving member simultaneously for constantly circulating motion at a speed higher than that of said first endless driving member and in a reverse direction during a copy cycle, said means defining slots on the scanning carriage each defining a slot whose length is such that each of the wheels at the ends of the said horizontal run of the respective one of said endless driving members has a radius shorter than the length of said slot.

4,124,289

ELECTROPHOTOGRAPHIC COPYING APPARATUS

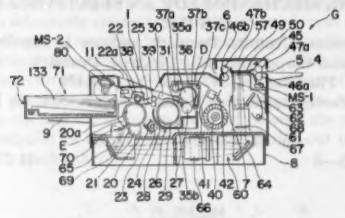
Shin Miyata; Takeji Morikawa, both of Toyokawa; Yoshihisa Kawai, Aichi; Shunji Yamamoto, Shinshiro, and Osamu Okada, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

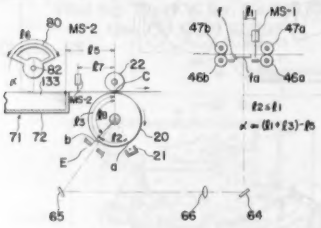
Filed Jul. 6, 1977, Ser. No. 813,183

Claims priority, application Japan, Jul. 8, 1976, 51-81728

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—14 **9 Claims**





1. An image transfer type electrophotographic copying apparatus of scanning type which comprises;

an original scanning station through which an original to be copied is scanned by an original scanning means,

an optical system including an exposure lamp for projecting scanned image of the original onto a rotating photosensitive member,

means provided around said photosensitive member including at least a corona charging means defining a charging station for uniformly charging the surface of the photosensitive member, an exposure slit defining an exposure station through which the projected image of the original passes, and an image transfer means defining a transfer station for transferring the image of the original formed on the photosensitive member onto a transfer material fed by a transfer material feeding means,

said electrophotographic copying apparatus further including a detecting means for generating signal to simultaneously energize said exposure lamp, said corona charger and said transfer material feeding means, with a distance $l1$ from the generation of said signal by said detecting means to arrival of leading edge of the original at a center of said original scanning station and a distance $l2$ between a center of said charging station of said photosensitive member and a center of said exposure station satisfying the equation of

$$.m l1 \geqq l2$$

wherein m is a magnification power, and with a distance $l3$ between said center of the exposure station of said photosensitive member and said transfer station and a distance $l5$ between a leading edge of the transfer material at transport initiating position thereof by said transfer material feeding means and said transfer starting of said photosensitive member satisfying the equation of

$$ml1 + l3 = l5 + \text{distance } \alpha \ (\alpha \geqq 0)$$

said transfer material feeding means having delaying function equivalent to the distance α from the energization thereof by said detecting means to starting of actual feeding of the transfer material.

4,124,290

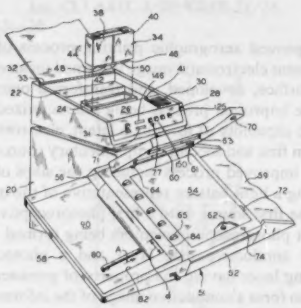
SYSTEM FOR INTERFACING AN AUTOMATIC PROCESSING MACHINE WITH A STACK OF DOCUMENTS WHICH IT IS PROCESSING

Donald J. Axelrod, Glenview, and John R. Flint, Barrington, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed May 4, 1977, Ser. No. 793,650

Int. Cl.[2] G03B *27/52*

U.S. Cl. 355—41 **7 Claims**



1. A system for interfacing a microfilm camera with a stack of documents which it is processing, said system comprising means for transporting said documents one-at-a-time to said camera to be photographed, at least one card being transportable along with said documents having machine readable encoded marks thereon for insertion between preselected documents in said stack, and means responsive to said encoded marks for supplying input signals, means for displaying a file number or an automatic searching blip mark adjacent each image photographed on microfilm and processing means responsive to said input signals for controlling the displayed file number or blip mark.

4,124,291

CONTROL OF DEPTH OF FIELD IN THREE DIMENSIONAL PHOTOGRAPHY

Allen K. W. Lo, and Jerry C. Nims, both of Dunwoody, Ga., assignors to Dimensional Development Corp., Atlanta, Ga.

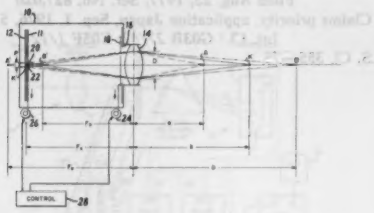
Filed Dec. 3, 1976, Ser. No. 747,354

Int. Cl.[2] G03C *9/00*; G03B *35/14, 27/32*

U.S. Cl. 355—22 **7 Claims**

1. In a method for taking a stereoscopic photograph of an object field with a camera of the type having a large effective aperture including a focusing lens and wherein a photosensitive surface located behind a lenticular screen is exposed to the

object field through said aperture, the object field including a key subject matter object on which the focusing lens is focused and one or both of a nearest foreground object located closer to the camera than the key subject matter object and a farthest background object located farther from the camera than the key subject matter object, the improvement comprising:



controlling one or more (1) the distance a from the focusing lens to the nearest foreground object, (2) the distance b from the focusing lens to the farthest background object, (3) the distance k from the focusing lens to the key subject matter object, (4) the focal length F of the lens and (5) the size D of the effective aperture in the direction of lenticule width, such that D is smaller than either:

$$\left[\frac{a(k-F)}{F(k-a)}\right]20w$$

or

$$\left[\frac{b(k-F)}{F(b-k)}\right]20w$$

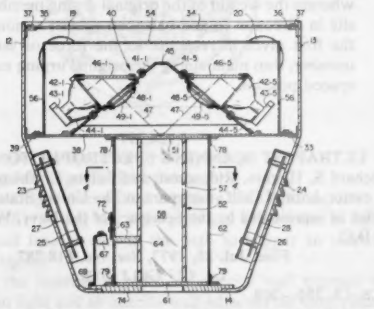
where w is the width in said direction of an individual lenticule.

4,124,292

LIGHT SOURCE FOR PHOTOGRAPHIC COLOR PRINTERS

Henri Van Wandelen, 716 Tamarack Ave., San Carlos, Calif. 94070

Filed Oct. 6, 1977, Ser. No. 839,973
Int. Cl.[2] G03B *27/54, 27/76*
U.S. Cl. 355—37 **14 Claims**



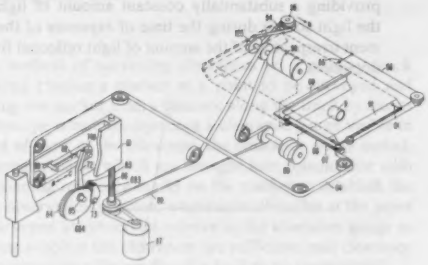
1. A light source for photographic printers comprising:
a plurality of individual lamps each providing white light,
a mirror associated with each of said lamps for reflecting light from said lamps into said mixing chamber, each of said mirrors serving to reflect light corresponding to a primary color,
a filter associated with each mirror serving to receive, filter and pass the reflected light, said mirrors serving to protect said filter by passing unwanted radiation and thereby permitting the use of high intensity lamps, and
a mixing chamber adapted to receive the light from said filters and additively mix the same to provide light of predetermined composition.

4,124,293

CAM-OPERATED SCANNING OPTICS DRIVE FOR A CONTINUOUSLY VARIABLE MAGNIFICATION SYSTEM

Raymond A. Daniels, and Paul Kummli, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 749,123, Dec. 9, 1976, abandoned. This application Jul. 25, 1977, Ser. No. 819,020
Int. Cl.[2] G03B *27/36*
U.S. Cl. 355—58 **5 Claims**



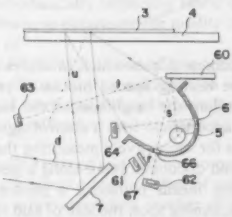
5. In a document copier machine, an optical drive system comprising:
a drive motor;
multiple-cam means connected to said drive motor for providing a variety of output motion;
cam selection means for providing a selected cam means in accordance with the size of copy paper being used;
carriage means for scanning a document; and means for connecting the selected cam to said carriage means,
whereby said carriage means is caused to scan said document at a variety of speeds and distances.

4,124,294

LIGHT EMISSION REGULATION DEVICE

Yoshihiro Nakamura, 86 Futami-cho, Toyokawa-shi, Aichi-ken, Japan

Filed Dec. 19, 1975, Ser. No. 642,355
Claims priority, application Japan, Jan. 16, 1975, 50-7567
Int. Cl.[2] G03B *27/74, 27/78*
U.S. Cl. 355—68 **3 Claims**



1. In a photocopying apparatus including an optical system having at least one light source for forming light rays to illuminate a document to be copied and for transmitting said light rays reflected from the document onto a photosensitive mem-

ber for forming a latent image of the document upon exposure thereof, and scanning means for providing relative movement between the document and the light source, light emission regulation means for regulating the light emitted from the light source, which light emission regulation means comprises:

a photoemissive element coupled to said light source for emitting light in a quantity proportional to the input voltage supplied to said light source;

a light detection element positioned to receive the light emitted by said photoemissive element for detecting the amount of light emitted by said photoemissive element;

enclosing means for enclosing said photoemissive element and said light detection element in a common lightproof enclosure; and

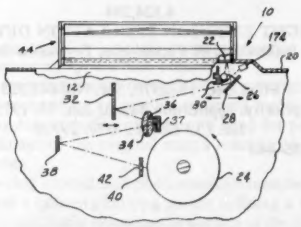
controlling means coupled between said light detection element and said light source for controlling the input voltage to said light source in response to the output of said light detection element; whereby said photoemissive element, light detection element and controlling means providing a substantially constant amount of light from the light source during the time of exposure of the document irrespective of the amount of light reflected from the document.

4,124,295

BACKGROUND BRIGHTNESS CONTROL FOR DOCUMENT COPIER

Kenneth W. Gardiner, Menlo Park, Calif., assignor to Savin Business Machines Corporation, Valhalla, N.Y.

Filed Feb. 2, 1977, Ser. No. 764,857
Int. Cl.[2] G03G *15/28;* G03B *27/74*
U.S. Cl. 355—68 **24 Claims**



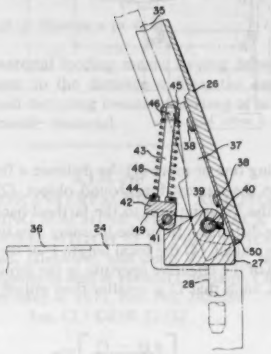
1. In a document copier which produces a copy of an original document bearing spaced blocks of printed matter, said copier controlling the brightness of the background areas of said copy in accordance with a control signal, apparatus comprising means for successively measuring the reflectance of the portions of said document lying along a generally linear strip, said measuring means including a photoelectric transducer providing a scanning spot, the size of said spot being less than the spacing between said blocks of printed matter to ensure that at least one of said portions corresponds to a background portion of said document, and means for providing said control signal as a function of the maximum reflectance measured by said measuring means.

4,124,296

ORIGINAL URGING DEVICE

Hirotoshi Kishi, Tokyo; Masao Ariga, Kawasaki; Hiroyuki Hattori, Inagi; Yoshiki Furukawa, Yokohama; Hiroshi Ogawa, Kawasaki; Takahiko Amanuma, Tokyo; Kazumi Umezawa, and Seiji Sagara, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1977, Ser. No. 827,020
Claims priority, application Japan, Sep. 1, 1976, 51-104638
Int. Cl.[2] G03B *27/62;* E05F *1/12*
U.S. Cl. 355—75 **5 Claims**



1. An original urging device comprising:

a first supporting member pivotable about a first pivot;

a second supporting member pivotable about a second pivot which is located at a position spaced from said first pivot;

a sliding member slidable along said second supporting member and engaging a part of said first supporting member;

a resilient member for biasing the sliding member in a predetermined direction;

an original urging member mounted to said first supporting member;

said first supporting member, second supporting member, sliding member and resilient member cooperating to enable said original urging means to take a first position urging an original against an imaging surface, and a second position in which said first supporting member and said original imaging member are spaced from the imaging surface to permit placement of an original on said surface, wherein the weight of the original urging member is opposite in direction to and balanced against a moment about the first pivot in response to the force of said resilient member, thus maintaining the original urging member at a spaced position.

4,124,297

ULTRAFAST SCANNING SPECTROPHOTOMETER

Richard S. Hughes, Ridgecrest, and Julian L. Thompson, Lancaster, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 25, 1977, Ser. No. 818,787
Int. Cl.[2] G01J *3/06*
U.S. Cl. 356—308 **10 Claims**

1. A fast scan spectral instrument comprising:

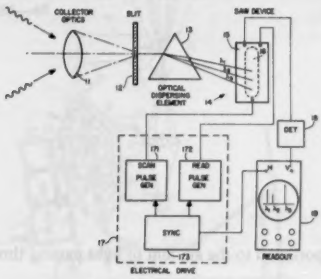
energy admitting means for directing a beam of optical energy to form a spectral image;

limiting means fixedly positioned with respect to said energy admitting means to receive the beam of optical energy from said energy admitting means for establishing a sharply defined energy field having pre-determined dimensions;

dispersion means fixedly positioned with respect to said

limiting means to be in optical communication therewith for breaking the sharply defined energy field into a plurality of beams which diverge from one another in a wavelength-dependent manner;

a surface acoustic wave photoelectric transducer fixedly positioned in optical communication with said dispersion means for spatially detecting the plurality of beams therefrom;



electrical means connected in circuit configuration with said surfae acoustic wave photoelectric transducer for energization thereof; and

readout means connected to said surface acoustic wave photoelectric transducer to receive the electrical output therefrom for utilization thereof.

4,124,298

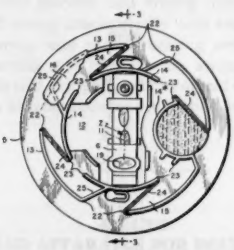
OPTICAL SMOKE DETECTOR INLET SCREEN

Donald F. Steele, Cohasset, Mass., assignor to Electro Signal Lab, Inc., Rockland, Mass.

Filed Mar. 14, 1977, Ser. No. 777,043

Int. Cl.[2] G01N *21/00;* G01B *17/10;* G01N *21/26*

U.S. Cl. 356—338 **5 Claims**



1. An optical smoke detector comprising:

a housing forming a dark chamber,

a source of light directed on a path in the chamber,

a photocell viewing the light path and responsive to light scattered from smoke in the path to trigger an electric alarm signal,

wherein the housing includes an exterior wall exposed to ambient light and an interior wall adjacent the dark chamber, the exterior and interior walls each having smoke ports peripherally offset with respect to the dark chamber, and

wire mesh means extending between the exterior and interior walls screening passage of insects into the dark chamber, the wire mesh means being inclined with respect to the exterior port such that its wires obstruct exterior light rays from passing directly to the interior port.

4,124,299

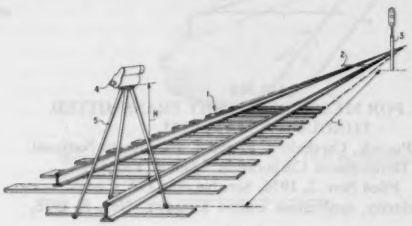
METHOD AND APPARATUS FOR SURVEYING CLEARANCES ON RAILWAY TRACKS

Adriaan Heystek, Bilthoven, Netherlands, assignor to Electrorail N.V., Utrecht, Netherlands

Continuation-in-part of Ser. No. 385,695, Aug. 6, 1973, abandoned. This application Jun. 27, 1975, Ser. No. 591,074

Int. Cl.[2] G01B *11/24*

U.S. Cl. 356—397 **6 Claims**



1. A method of surveying clearances on a railway track comprising placing a marker at a point to be surveyed and observing the marker from a distance along the track by means of a telescope which incorporates a clearance gauge visible in the field of view of the telescope, the clearance gauge including reference marks which are brought into coincidence with corresponding reference marks on the marker to establish the correct observation position, whereupon obstacles at the point to be surveyed are observed relative to the clearance gauge to determine whether the clearances are sufficient, said clearance gauge representing the profile of a load to be transported.

4,124,300

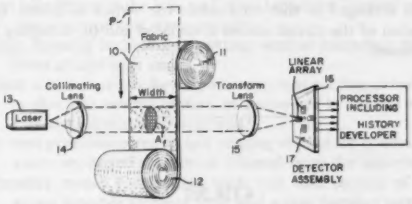
METHOD FOR AUTOMATIC FABRIC INSPECTION

Donald C. Mead, Granada Hills; Harvey L. Kasdan, Van Nuys, both of Calif., and Jordan L. Dorrity, Greenwood, S.C., assignors to Greenwood Mills, Inc., Greenwood, S.C.

Filed Feb. 23, 1976, Ser. No. 660,252

Int. Cl.[2] G01N *21/30*

U.S. Cl. 356—429 **28 Claims**



1. A method of automatically inspecting fabric comprised of warp and filling threads to determine the quality of the fabric, including the steps of:

(a) irradiating the fabric with a beam of monochromatic light of given cross-sectional area sufficient to encompass a large number of warp and filling threads for developing from said fabric a diffraction pattern having a central lobe and side lobes,

(b) detecting at least a part of said diffraction pattern including detecting a predetermined number of said side lobes respectively by a corresponding number of linear arrays of photodetectors without using any reference diffraction pattern, and

(c) individually analyzing each detected side lobe itself by processing only the outputs of the photodetector array corresponding to the respective detected side lobe being

analyzed to provide data indicative of the quality of said fabric,

said side lobes being along axes oriented in directions normal to said warp and filling threads respectively, and wherein said processing step includes the steps of comparing the height and shapes of said side lobes to given references to provide at least a part of said output data.

4,124,301

DEVICE FOR MEASURING LIGHT TRANSMITTED THROUGH A MATERIAL

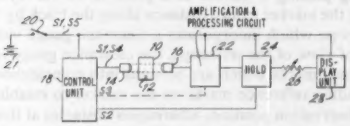
Sydney N. Pocock, Carshalton, England, assignor to National Research Development Corporation, London, England

Filed Nov. 2, 1976, Ser. No. 738,172

Claims priority, application United Kingdom, Nov. 5, 1975, 45918/75

Int. Cl.[2] G01N *21/24*

U.S. Cl. 356—432 **5 Claims**



1. A device for determining the light received from an illuminated material comprising: a filament lamp; a light detector spaced from the lamp; circuit means arranged to operate the filament lamp in a flash mode and to derive a signal in accordance with the intensity of light received from the filament lamp by the detector; temperature sensing means arranged to detect the attainment by the lamp filament of a predetermined operating temperature and to allow derivation of said signal only after that level has been reached; display means connected to the circuit means so as to provide a display related to the derived signal; and a normally open manually operable switch arranged so that only while the switch is closed: (a) operation of the circuit means is initiated and (b) a display is maintained.

4,124,302

DEVICE FOR PHOTOMETERING A SUBSTANCE PLACED IN A CYLINDER-SHAPED CELL

Sergei V. Kuzmin, Novosibirsk, U.S.S.R., assignor to Novosibirsky Institut Organicheskoi Khimii Sibirskogo Otdelenia Akademii Nauk SSSR, Novosibirsk, U.S.S.R.

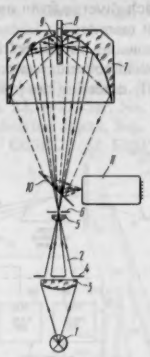
Filed Mar. 9, 1977, Ser. No. 775,854

Claims priority, application U.S.S.R., Mar. 11, 1976, 2337479

Int. Cl.[2] G01N *21/24*

U.S. Cl. 356—440 **2 Claims**

1. A device for photometering a substance placed in a cylinder-shaped cell comprising: a light source; a light beam emitted by said light source; an aperture diaphragm arranged in the path of said light beam for limiting said light beam; an elliptical mirror arranged in the path of said light beam beyond said aperture diaphragm, and coaxially with said cylinder-shaped cell containing a substance to be photometered for focusing said light beam on said cell; and a photoreceiver, in the path of said light beam after said light beam has passed through said cell and has been collected by said elliptical mirror and thereafter reflected by a semi-transparent mirror, for producing a



signal proportional to the amount of light passing through said cell.

4,124,303

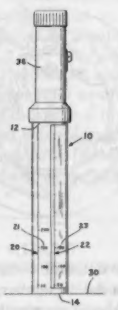
SURFACE-GLOSS MEASURING DEVICE

Burkett C. Herrick, Bloomfield Hills, Mich., assignor to Tuff-Kote Dinol, Inc., Warren, Mich.

Filed Apr. 5, 1977, Ser. No. 784,718

Int. Cl.[2] G01N *21/48*

U.S. Cl. 356—445 **8 Claims**



1. A device for measuring the glossiness of a surface, such as an automobile surface, comprising: an elongated cylinder having a hollow interior, and a circumferential wall surface, said elongated cylinder having a first open end and a second closed end; reflecting means mounted on the interior portion of said second closed end and on half of the inner circumferential portion of said wall surface; and scale means formed in the other half of said circumferential wall surface, said scale means being translucent in part so as to allow light directed into the interior of said elongated cylinder via said first open end to pass therethrough.

4,124,304
DIRECT DRUM DRIVE FOR CONCRETE MIXER TRUCKS

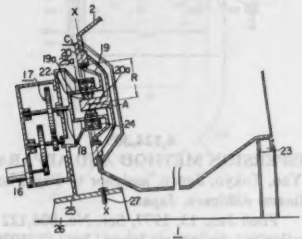
Koichi Suganuma, Yokohama, Japan, assignor to Okubo Haguruma Kogyo Kabushiki Kaisha, Kanagawa, Japan

Filed Aug. 1, 1977, Ser. No. 820,945

Claims priority, application Japan, Apr. 27, 1977, 52-52671[U]

Int. Cl.² B28C *5/18*

U.S. Cl. 366—60 **6 Claims**



1. A device for driving and supporting a drum of a concrete mixer truck, comprising in combination: a casing mounted on the mixer truck; means for fixedly connecting said casing to the mixer truck; a driving shaft housed in said casing; a universal coupling disposed to connect said driving shaft in driving relationship with said drum, said coupling being composed of a driving member fixedly mounted on said driving shaft in a manner to rotate about the same axis as said driving shaft, and a driven member fixed to the drum and in driving engagement with said driving member, engaged portions of said driving and driven members being disposed to rotate about said axis; means for rotatably supporting at least the weight of the drum and transmitting it to said casing, said supporting and transmitting means comprising a first spherical bearing disposed between said driving and driven members of said coupling for rotation about said axis of said driving shaft, and a second bearing disposed between said driving member of said coupling and said casing concentrically with said first bearing; all said first bearing, said second bearing and said means for fixedly connecting said casing being arranged on the same plane in which said engaged portions of said coupling rotate so that the drum weight produces a minimum bending moment to said device.

4,124,305
METHOD AND APPARATUS FOR ROUNDING LUMPS OF DOUGH

Johan Benier, Vught, Netherlands, assignor to Benier B.V., 's-Hertogenbosch, Netherlands

Filed Dec. 3, 1976, Ser. No. 747,326

Claims priority, application Netherlands, Dec. 8, 1975, 7514266

Int. Cl.² B28C *1/16;* A21C *3/02*

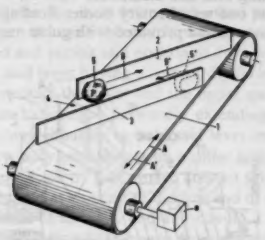
U.S. Cl. 366—69 **8 Claims**

1. An apparatus for rounding lumps of dough comprising:

(a) a supporting surface for supporting one or more lumps of dough;

(b) two substantially parallel wall portions positioned above and extending upwardly over said supporting surface, said supporting surface and said two substantially parallel wall portions defining a rounding trough for rounding said lump of dough, said rounding trough being positioned at an angle to the direction of movement of said supporting surface; and

(c) means for reciprocating and supporting surface for alternately contacting said lump of dough first with one and



thereafter with the other of said two substantially parallel wall portions.

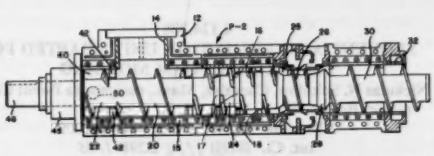
4,124,306
VENT FOR DEVOLATILIZING SCREW PRESS

Dean K. Bredeson; Gregory C. Craig; William J. Gilius, all of Piqua, and Charles R. Johnson, Akron, all of Ohio, assignors to The French Oil Mill Machinery Company, Piqua, Ohio

Filed Nov. 30, 1977, Ser. No. 856,104

Int. Cl.² B01F *11/00*

U.S. Cl. 366—75 **3 Claims**



1. In apparatus for devolatilizing materials such as solvent containing polymers, the combination of

a cylindrical housing having inlet and discharge ends,

a screw member rotatably mounted in said housing and operative to work material so as to release contained vaporizable substances from the material,

an inlet fitting at the inlet end of said chamber located opposite a part of said screw member,

said housing including a venting section extending therefrom at said inlet end,

said screw member having a screw vent section extending within said venting section, and arranged to convey material toward said discharge end,

a vent pipe connected to said venting section for conducting away vaporized substances released from the material,

breaker means cooperating with said vent section of said screw member to clean from said screw member material tending to cling thereto and to clog the passage between said venting section and said screw vent section.

4,124,307
HOMOGENIZER FOR VISCOUS MATERIALS

Ladislav Anisic, Seevetal, Fed. Rep. of Germany, assignor to Fried. Krupp GmbH, Essen, Fed. Rep. of Germany

Filed Jul. 18, 1977, Ser. No. 816,691

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1976, 2632335

Int. Cl.² B29B *1/06*

U.S. Cl. 366—76 **10 Claims**

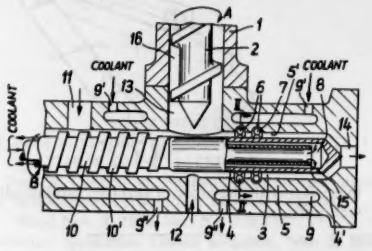
1. A homogenizer for composite viscous materials, comprising:

a cylindrical chamber having a wall provided with an inlet and an outlet spaced apart along the cylinder axis;

a rotatable mandrel coaxially mounted in said chamber, said wall and said mandrel having confronting substantially

cylindrical peripheral surfaces separated by an annular clearance extending from said inlet substantially to said outlet, said mandrel being devoid of any formation projecting into said clearance;

at least one set of rotary bodies floatingly disposed in said clearance and provided with guide means for maintaining



said bodies within a predetermined axial zone of said chamber; and

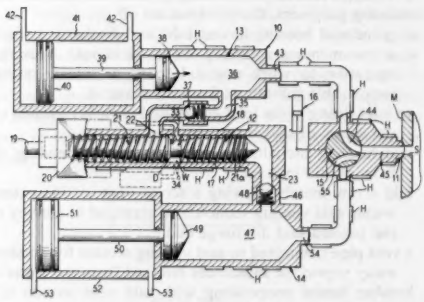
feed means for delivering viscous material to be homogenized to said inlet under a pressure sufficient to drive said material past said rotary bodies through said clearance to said outlet at a rate independent of the rotary speed of said mandrel.

4,124,308

SEQUENTIAL CO-INJECTION UNIT ADAPTED FOR STRUCTURAL FOAM MOLDING

Nickolas N. Sokolow, Cheshire, Mass., assignor to Beloit Corporation, Beloit, Wis.

Filed Jun. 21, 1977, Ser. No. 808,704
Int. Cl.[2] B29B 1/10; B29F 1/03
U.S. Cl. 366—77 **4 Claims**



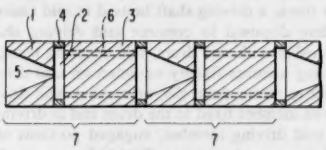
1. A single screw, single nozzle injection unit for sequential injection of unfoamed and foamed plastics melts to a mold for forming skin covered foamed plastics articles which comprises a housing having a cylindrical bore, an elongated screw rotatably mounted in said bore, a means feeding plastics material to said bore at one end of said screw, a gas inlet feeding foaming agent to said bore intermediate the ends of said screw, a seal radiating from said screw intermediate the ends thereof defining an extrusion gap communicating with said gas inlet, said screw having helical vanes mating with said bore and varying root diameters along the length thereof, said root diameters cooperating with said vanes to provide a feed zone advancing plastics material from the one end of the screw, a compression zone for compressing and plasticizing the material, a first pumping zone for extruding the material through said gap, a gas well zone for mixing the plastics material extruded from the gap with gas from said gas inlet, a second pumping zone advancing the gas and plastics material, and a mixing zone forming a gas foamed plastics material, a first port communicating with said first pumping zone, a second port communicating with said mixing zone, a first injector communicating with said first port, a second injector communicating with said second port, a nozzle, a valve selectively joining said injectors with said nozzle, injector heads for forcing the plastics material from the injectors to the valve, and an actuator for the valve to first join the first injector with the nozzle for feed of skin melt material to the mold, for next joining the second injector with the nozzle for feed or foamed melt material to the mold and for next sealing the nozzle from both injectors to allow solidification of the melt material in the mold.

4,124,309

DISPERSION METHOD AND APPARATUS

Yasunori Yao, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Jun. 13, 1977, Ser. No. 806,122
Claims priority, application Japan, Jun. 11, 1976, 51-69152
Int. Cl.[2] B01F 5/06
U.S. Cl. 366—340 **3 Claims**



1. In a process for dispersing one liquid of two mutually insoluble liquids into the other liquid or dispersing a pulverized solid powder into a liquid comprising carrying out the following process successively a plurality of times in a continuous series: jetting a mixture of said liquids or said liquid and said solid from a nozzle into a relatively wider gap portion than said nozzle to impinge the mixture upon a wall surface of a magazine containing a plurality of openings thereby changing the liquid flow direction, passing said mixture into said openings and carrying said mixture through said magazine to the feed for the nozzle of the next stage in the series.

4,124,310

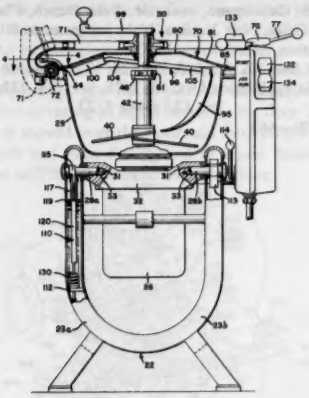
FOOD PROCESSING APPARATUS

Donald A. Brackman, Dayton, and Stuart E. Athey, Troy, both of Ohio, assignors to Hobart Corporation, Troy, Ohio

Filed Jun. 6, 1977, Ser. No. 803,459
Int. Cl.[2] B01F 7/18
U.S. Cl. 366—314 **1 Claim**

1. In an apparatus for processing foodstuffs, including a mixing bowl having a drive shaft extending into the bowl through the bottom thereof, a motor mounted outside the bowl and connected to rotate the drive shaft, food processing blades mountable on the drive shaft within the bowl for processing foodstuffs therein when the motor is operated, and a cover system including a lid for closing the top of the bowl, the improvement comprising a flexible, semi-rigid, perforated, non-ductile, contents supporting food basket, the exterior of which is shaped to conform to the shape of the interior surface

of the bowl and to fit the bowl interior closely to cause the bowl to restore said basket to its proper, bowl matching shape



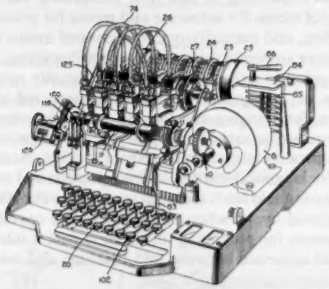
whenever inserted into the bowl, and to support and retain foodstuffs therein when removed from the bowl.

4,124,311

MECHANICAL MOVEMENTS FOR CODING MACHINES

Albert H. Reiber, Evanston, Ill., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 5, 1940, Ser. No. 317,455
Int. Cl.[2] B41J *7/66*
U.S. Cl. 400—90 **18 Claims**



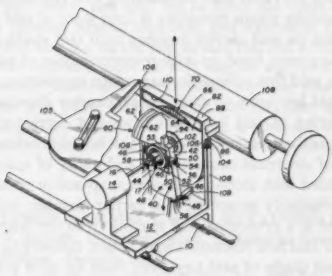
1. A ciphering unit mechanism, comprising a rotatable cam sleeve provided with a plurality of cams, a clutch engageable to effect driving of said sleeve, a plurality of character keys, a swingable bail operable by all of said keys connected to release said clutch to engage with said sleeve, a plurality of coaxial drums mounted for independent step-by-step rotation, each said drum having on each face a number of contacts equal to the number of said keys with the contacts on one face randomly connected to those on the other face, a fixed member between each two drums having means to connect each said contact on the adjacent face of the drum on one side of the fixed member to a contact on the adjacent face of the drum on the other side, each said drum having a circumferential series of teeth equal in number to said contacts, an individual circuit closable by each said key connected to some one of said random circuits; an operating mechanism for each of said drums, including a rotatable wheel having a circumferential series of teeth and a series of longitudinally slidable pins disposed parallel to the axis of said wheel and equal in number to the teeth thereon, two pawls respectively engaging the teeth on said drum and said wheel, a longitudinally reciprocable push bar operatively connected to both said pawls, the forward portion of said bar being pivoted on the after portion thereof for vertical movement and having a forwardly facing shoulder and a rearwardly extending finger, a conditioning lever pivoted intermediate its ends having at its lower end a stud positioned to contact said finger and raise the said forward portion when said lever is latched and permit said portion to drop when said lever is unlatched, said lever having a rearwardly facing latching shoulder intermediate the pivot and the upper end of said lever, a pivoted latch having a forwardly extending arm to engage to said latching shoulder to hold said lever in latched position and a rearwardly extending arm, a roller arm pivoted at one end, a roller carried by said arm to contact said pins, a translating lever pivoted at one end to the free end of said arm and slidably supported at its other end and having a latching projection on its upper side, a latching pin on said conditioning lever engageable by said projection to latch said lever, means to retract said translating lever and hold said roller in the path of such of said pins as are in one position, bail actuatable by a cam on said sleeve to swing said translating lever up when said roller is riding over a said pin, means actuated by said translating lever to release a said latch and free the lever controlled thereby to raise the forward portion of a push bar associated with such lever, and an operating bail actuated by a cam on said sleeve to engage the shoulders on all push bars thus raised and thereby to rotate one tooth each the drum and wheel associated with each said push bar raised as aforesaid.

4,124,312

IMPACT PRINTER WITH PRINT WHEEL CARTRIDGE

Robert A. Johnson, Plano, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 10, 1977, Ser. No. 767,249
Int. Cl.[2] B41J *1/30*
U.S. Cl. 400—144.2 **11 Claims**



1. In an impact printer for use with a print wheel cartridge: A movable carriage, a motor supported by said carriage, a rotatable shaft extending from said motor and having coupling means at one end thereof, said carriage having guide means supported thereon for slidably receiving the cartridge therein, said shaft being rotatable relative to said guide means, said guide means being arranged for guiding the cartridge for slidable movement in a direction generally transverse to the axis of rotation of said shaft, and movable means actuatable by the cartridge during movement thereof in the transverse direction for effecting relative movement between said coupling means and the cartridge in a different direction than said transverse direction toward each other to a print wheel loaded position.

4,124,313

KEYBOARD ASSEMBLY

Helmut Schmidt, Villingen-Schwenningen; Walter Strobel, Unterkirnach; Günter Treude, and Paul Blaser, both of Villingen-Schwenningen, all of Fed. Rep. of Germany, assignors to Kienzle Apparate GmbH, Villingen, Fed. Rep. of Germany

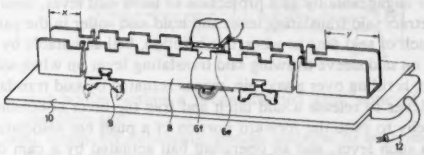
Continuation of Ser. No. 604,332, Aug. 13, 1975, abandoned, and a continuation of Ser. No. 604,333, Aug. 13, 1975, abandoned.

This application Mar. 21, 1977, Ser. No. 779,936

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1974, 2440265

Int. Cl.² B41J *5/12*

U.S. Cl. 400—491.2 **19 Claims**



1. A keyboard arrangement comprising, in combination, a plurality of assembled key units, each assembled key unit comprising a plurality of components including a stationary housing, a shaft movable relative to said housing, a cap connected to said shaft and operative for moving said shaft from an initial position to an actuating position, and biasing means intermediate said shaft and said housing for restoring said shaft to said initial position; at least one elongated carrier member provided with a row of apertures extending along the length of said carrier member, said assembled key units and said carrier member being provided with cooperating first releasable snap-action connecting means mounting at least some of said assembled key units on said carrier member with said shafts of said assembled key units lined up with respective ones of said row of apertures, said first releasable snap-action connecting means mounting said key units on said carrier member dismountably for dismounting of said key units from said carrier member from above said carrier member; a circuit board provided with a plurality of electrical components; a plurality of spacer elements provided with second releasable snap-action connecting means dismountably mounting said carrier member upon said circuit board at a predetermined spacing from the latter independently of said first releasable snap-action connecting means and with said shafts of said key units lined up with predetermined ones of said circuit components, said plurality of assembled key units being provided with releasable connecting means holding said stationary housing, said shaft and said biasing means together in assembled condition independently of said first and second releasable snap-action connecting means, said carrier member being dismountable from said circuit board without dismounting of said assembled key units from said carrier member and without disassembly of said cap, said stationary housing, said shaft and said biasing means of the assembled key units by releasing said second snap-action connecting means, each assembled key unit being dismountable from said carrier member from above without disassembly of said stationary housing, said shaft and said biasing means by releasing said first releasable snap-action connecting means.

4,124,314

JUSTIFYING TEXT WRITING COMPOSING MACHINE

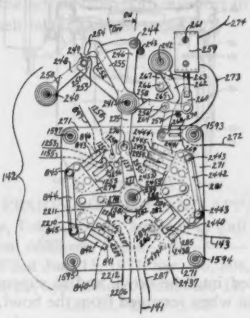
William S. Gubelmann, deceased, late of Convent, N.J.; by Walter S. Gubelmann, executor, Palm Beach, Fla., and William R. Grier, New Vernon, N.J., assignors to R & I Patent Corporation, Morristown, N.J.

Division of Ser. No. 213,045, Dec. 28, 1971, Pat. No. 3,993,179.

This application Oct. 15, 1976, Ser. No. 733,061

Int. Cl.² B41J *5/22*

U.S. Cl. 400—663 **9 Claims**



1. A control mechanism for controlling a justifying typographic apparatus having a carriage, for assuring the performance of a sequence of steps in an operational cycle which is determined by (i) a first step of said carriage for correspondingly shifting a print point in a line, and (ii) a last step in said sequence comprising a carriage return step in said line, said typographic apparatus comprising means for producing justification data corresponding to said line, comprising manually operable control means for actuating said means for producing justification data, said manually operable control means being shiftable between an "on" position and an "off" position, locking means coupled to selectively lock said manually operable control means, actuating means operatively connected to said locking means for bringing the locking means into locking position in response to said first step of an operational cycle, latch means operatively connected to said locking means for latching said locking means in said locking position and release means for releasing said latch means in response to the last step of said operational cycle, whereby change of the operational state of said means for producing justification data is inhibited in steps of said sequence between said first step and said last step.

4,124,315

FLOOR FINISH APPLICATOR

Joseph E. Melton, Grand Rapids, Mich., assignor to Melton Systems, Inc., Grand Rapids, Mich.

Continuation of Ser. No. 591,850, Jun. 30, 1975, Pat. No. 3,981,596, which is a continuation-in-part of Ser. No. 432,098, Jan. 9, 1974, abandoned. This application Sep. 20, 1976, Ser. No. 724,634

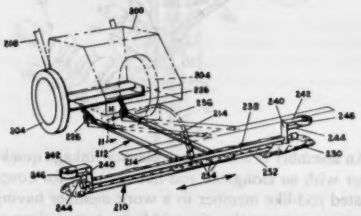
Int. Cl.² A46B *11/02*

U.S. Cl. 401—48 **7 Claims**

1. In a floor finish applicator wherein liquid finish is applied to a floor and spread out into a smooth even finish by moving over the floor surface a finish spreading means having a soft, absorbent floor contacting material on the underside thereof, an improved means for applying and spreading finish on the floor comprising:

porous floor contacting mop means for simultaneously applying and spreading liquid finish on the floor, the mop means comprising a floor contacting mop material formed of a plurality of fibrous strands attached to a fabric backing and being fabricated such that liquid finish applied to

the top of the fabric backing of the mop means flows through the fabric backing and soaks into the mop material and is dispensed on the floor by contact between the soaked mop material and the floor, the fabric backing of the mop means being sufficiently porous to permit enough liquid finish to flow through the mop means solely under the influence of gravity to provide an adequate but not excessive covering of liquid finish for the floor as the mop means is moved over the floor said mop means providing a smooth and even distribution of liquid finish over the floor as said mop is moved over the floor;



spreader frame means for supporting the mop means on the underside thereof in floor contacting position as it is moved across the floor; and

finish dispensing means for continuously dispensing liquid finish on the upper side of the fabric backing of the mop means as the mop means is moved across the floor, the finishing dispensing means applying no pressure on the liquid finish to force it through the mop means but permitting the liquid finish to flow through the mop means solely under the influence of gravity.

4,124,316

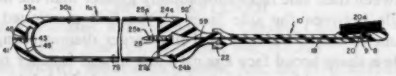
TOOTHBRUSH WITH DENTIFRICE ATTACHMENT

James L. O'Rourke, 6351 Memorial, Detroit, Mich. 48228

Continuation-in-part of Ser. No. 646,501, Jan. 9, 1976, Pat. No. 4,049,354, which is a continuation-in-part of Ser. No. 506,009, Sep. 16, 1974, Pat. No. 3,936,200. This application Jul. 12, 1976, Ser. No. 704,333

Int. Cl.[2] B43M *11/06*

U.S. Cl. 401—184 **7 Claims**



1. A toothbrush comprising an elongated cartridge unit and an elongated brushing unit joined end to end, said brushing unit including a shank portion having a head at the end thereof opposite said cartridge unit provided with bristles extending laterally therefrom, said cartridge unit having a chamber therein defined at least in part by a squeeezable wall, a replaceable dentifrice tube disposed in said chamber, passage means from said replaceable tube through said cartridge and brushing units to said head to convey dentifrice to said head when forced from said tube by the squeezing of said wall, said chamber having an opening in the end opposite said brushing unit which is closed by a removable cap, said tube being replaceable through said opening, cooperating interengaging means on said cap and tube enabling the removal of said tube through the opening in said chamber when said cap is removed, and check valve means in said cap for admitting air into said chamber when squeezing pressure upon said squeezable wall is released, the end of said tube adjacent said cap being sealed so that air admitted to said chamber by said check valve means will not contaminate the dentifrice in said tube.

4,124,317

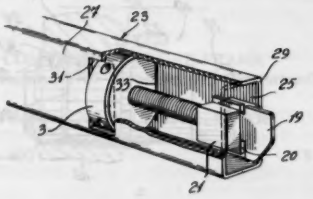
COUPLING MEANS

Michael F. Dauth, Montreal, Canada, assignor to Metalworks Limited, Lachine, Canada

Filed Sep. 20, 1976, Ser. No. 724,555

Int. Cl.[2] F16B *9/00*

U.S. Cl. 403—8 **1 Claim**



1. A coupling between an end of a tubular member and a face of a support element, said coupling comprising an open-ended hollow tubular member of a rectangular cross section and including first side walls connected together by second side walls, a wheel having a central circular opening therein, a screw thread on the inner surface of said central opening, a rod member comprising a longitudinal rod having a screw thread on the outer surface thereof, the wheel screw thread and the rod screw thread comprising mating threads, said first side walls having formed therein passages aligned transversely of said tubular member, said passages each being generally rectangular in outline and of a width generally equal to the thickness of said wheel and said first side walls being spaced apart a distance less than the diameter of said wheel with said wheel being mounted within said tubular member for rotation while being substantially fixed against movement longitudinally of said tubular member, said wheel extending outwardly beyond said first side walls for ease of manipulation and being generally supported by said second side walls, said rod being threaded into said wheel and extending longitudinally through said tubular member towards said open end, said support element face having an opening therethrough, a lug carried by said rod extending through said opening and interlocking behind said face, said rod being tensioned by said wheel between said wheel and said lug to force the open end of said tubular member against said face, and transverse guide means supporting said lug on the end of said rod and extending laterally from opposite sides of said lug to said first side walls transversely positioning said tubular member relative to said face, and said guide means having and end face spaced from the interlocking portion of said lug a distance substantially equal to the thickness of said support face opening.

4,124,318

SPLINED ASSEMBLY WITH RETAINING RINGS

Daniel V. Sagady, Hemlock, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 23, 1978, Ser. No. 889,238

Int. Cl.[2] F16D *1/10*

U.S. Cl. 403—14 **2 Claims**

1. A splined assembly with retaining rings comprising,

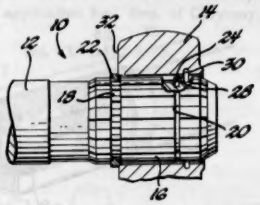
a male part having a splined portion, a first retaining groove, and a second retaining groove spaced axially therefrom,

a female member having a splined bore mating with the splined portion of the male member and a side face surrounding the splined bore at one end, said splined bore having a retention groove spaced axially from said side face and a release groove located on the side of the retention groove remote from said side face,

a removable split retaining ring disposed in the first retaining groove of the male member and engaging the side face of the female member for limiting insertion of the male member into the female member and aligning the second retain-

ing groove of the male member with the retention groove of the female member,

a second split retaining ring disposed in the second retaining groove of the male member and the retention groove of the female member under radial compression for preventing withdrawal of the male member from the female member,



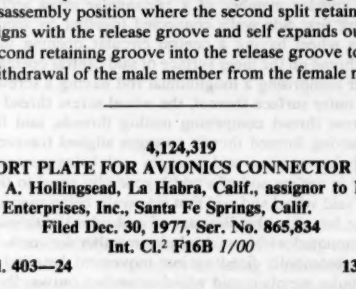
said male member being further insertable into the female member upon removal of the split retaining ring to a disassembly position where the second split retaining ring aligns with the release groove and self expands out of the second retaining groove into the release groove to permit withdrawal of the male member from the female member.

4,124,319

SUPPORT PLATE FOR AVIONICS CONNECTOR SHELL

Robert A. Hollingsead, La Habra, Calif., assignor to Hollingsead Enterprises, Inc., Santa Fe Springs, Calif.

Filed Dec. 30, 1977, Ser. No. 865,834
Int. Cl.[2] F16B *1/00*
U.S. Cl. 403—24 **13 Claims**



1. An apparatus to support the rear portion of a connector shell secured over an opening in the backplate of an avionics tray, wherein the connector shell defines mounting holes in the top and bottom of the shell which are arranged to receive mounting bolts for securing the shell to one side of the backplate, the apparatus including a first support plate comprising:

a pair of spaced co-planar flange sections located at each end of the support plate, the flange sections defining mounting holes therein adapted to align with one of the top and bottom mounting holes in the connector shell, the flange sections being further arranged to be secured to the other side of the backplate; and

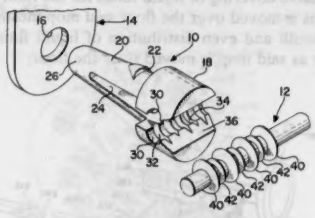
an intermediate section extending between the flange sections and aligned in a plane perpendicular to the plane passing through the flange sections, the intermediate section including a connector shell engaging portion which extends beyond the plane passing through the flange sections centrally of the support plate for abutting a surface of the connector shell midway between the mounting holes therein when the connector shell and support plate are secured on opposite sides of the backplate, whereby the support plate will resist movement of the central portion of the connector shell toward the plane passing through the flange sections.

4,124,320

LINKAGE QUICK-CONNECT FASTENER

George M. Rapata, Schaumburg, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 23, 1977, Ser. No. 780,217
Int. Cl.[2] F16C *11/06*; F16D *1/12*
U.S. Cl. 403—163 **12 Claims**



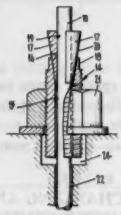
1. An assembly of a one-piece plastice linkage quick-connect fastener with an elongated rod-like member for coupling said elongated rod-like member to a work member having a complementary aperture therein, said fastener including a laterally extending head having a size substantially greater than the diameter of said aperture, and an axially extending shank, a slot extending axially of the fastener through the head and the shank and terminating short of the free nose end of said shank remote from said head thereby forming a resilient hinge connecting symmetrical head and shank leg portions, each of said legs including shoulder means intermediate the extremities of their exterior surfaces and spaced from said head, said head including recess means extending normal to the axis of said fastener and having a predetermined diameter greater than the width of said slot, said elongated member having a plurality of thin axially spaced annular rings and said recess means including substantially complementary grooves in the wall of said recess means for retaining said elongated member in fixed relation along the axis of said recess and member, said rings having a predetermined larger diameter than the diameter of said elongated member, a second set of rings each positioned medially between said larger rings along the axis of said elongated member, said second set of rings having a diameter smaller than the diameter of the first mentioned rings but larger than the diameter of the adjacent portion of said elongated member, said second set of rings having an included angle between their side faces substantially greater than the included angle between the side faces of the first mentioned larger diameter rings, whereby said first larger diameter rings provide a sharp broad face against shear in said fastener recessed groove and said second set of rings provide high lateral pressure against said recess walls to control cold flow about the larger rings, said head adjacent said slot being provided with lead-in means throughout its length to guide said elongated member into said recess as well as to cam said head apart and enlarge said slot to expose said recess means to said elongated member, said elongated member being a metallic rod and having said rings thread rolled on said rod adjacent one end thereof, said thread rolled rings each having adjacent grooves in said rod which provide the material that is displaced during thread rolling to form the adjacent larger diameter annular rings and said second set of annular rings, said fastener recess having grooves in the walls forming said recess which have a diameter less than the diameter of said larger diameter rings whereby said larger diameter rings are adapted to bite into said fastener recess grooves and produce cold flow of the fastener material into adjacent rod grooves with said second set of rings controlling the amount of cold flow about said larger diameter rings to prevent closing up of said slot and thereby insure engagement of said shoulder means with the aperture in the work member.

4,124,321

ADJUSTABLE TIE ROD HOLDER

Warwick B. Hutchins, Kew, Australia, assignor to B.B.R. Australia Pty. Ltd., Campbellfield, Australia

Filed Apr. 5, 1977, Ser. No. 784,827
Claims priority, application Australia, Apr. 6, 1976, 5507/76
Int. Cl.[2] F16B *9/00*
U.S. Cl. 403—167 1 Claim



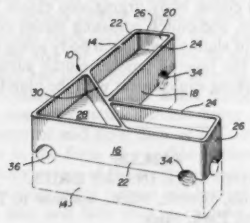
1. A tie rod for clamping a workpiece including a headed portion on one end and a substantially smooth walled portion of uniform size at the opposite end, a cylindrical sleeve member encircling the smooth walled portion of said tie rod and including an externally threaded body of substantially uniform diameter terminating at one end in at least a pair of oppositely disposed flat shoulders, an internal bore extending through said sleeve including a first portion complementary to said tie rod and a second portion extending outwardly from said complemental portion in conical configuration at said one end of said sleeve, wedge means complementary to said conical portion of said bore of said sleeve and including a portion dimensioned to embrace said tie rod and configured to grip said tie rod when said sleeve is moved relative to said tie rod and toward said wedge, rotatable tensioning means threaded on said sleeve and engaging one surface of said workpiece, said tensioning means upon rotation simultaneously applying clamping and tensioning forces to said tie rod to clamp said workpiece between the headed end portion of said tie rod and the rotatable tensioning means.

4,124,322

CORNER FASTENER

Rudolph E. Parisien, 891 Rainbow St., Ottawa, Canada

Filed Mar. 25, 1977, Ser. No. 781,311
Claims priority, application Canada, Apr. 28, 1976, 251327
Int. Cl.[2] F16B *13/10*
U.S. Cl. 403—295 3 Claims



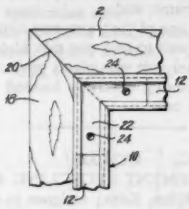
1. A corner key for use in securing channel members together to form a frame, said corner key comprising a pair of mating substantially identical members, each said member having two sections joined at their ends to form an L-shaped corner key, at least one transverse groove in a mating face of each of the sections adjacent an end thereof so that when mating identical members are placed face to face said grooves provide threaded transverse apertures which are less than cylindrical, whereby cylindrical threaded bolts inserted in said apertures cause said members to be urged apart, one said transverse groove in one section of said member having a thread which is one-half turn ahead of the thread in said groove of said other section of said member so that mating threaded grooves will provide a threaded aperture to receive said bolt.

4,124,323

COMPOSITE PICTURE FRAME

Richard B. Freeman, 1707 Yorktown Dr., Charlottesville, Va. 22901

Filed Jul. 20, 1977, Ser. No. 817,436
Int. Cl.[2] G09F *1/12*
U.S. Cl. 403—402 5 Claims



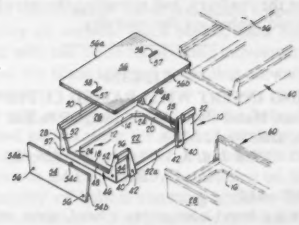
1. A composite framing strip comprising:
a strip of wood having a rabbet extending therealong and defining a pair of mutually perpendicular surfaces;
an elongated extruded metal member defining an open undercut channel portion having a bottom web, said channel portion being positioned in said rabbet with its bottom web perpendicular to one of said surfaces and spaced from the other surface, the open side of said channel portion facing away from said other surface; and
means fixedly securing said metal member to said strip of wood.

4,124,324

MODULAR CABLE TRENCH SYSTEM

John M. Augis, and Victor J. Buehlman, both of San Jose, Calif., assignors to Indian Head Inc., New York, N.Y.

Filed Jan. 16, 1978, Ser. No. 869,674
Int. Cl.[2] E01C *11/22*
U.S. Cl. 404—3 21 Claims



18. A modular cable system comprising:
a modular integrally molded tee unit including
a centrally opened, horizontally extending bottom frame of substantially rectangular configuration;
a pair of opposed, substantially parallel side plates of substantially rectangular configuration and each having an edge connected to an edge of said bottom frame, and each extending upwardly and outwardly from said

bottom frame at an angle to the vertical, one of said side plates having an opening formed at a central location therein; and

a pair of opposed, substantially parallel transverse reinforcing elements interconnecting and reinforcing said side plates and formed integrally therewith and with said bottom frame;.

a modular, integrally molded channel unit connected to said tee unit and including:

a centrally opened, horizontally extending bottom frame of substantially rectangular configuration;

a pair of opposed, substantially parallel side plates of substantially rectangular configuration and each having an edge connected to an edge of said bottom frame, and each extending upwardly and outwardly from said bottom frame at an angle to the vertical; and

a pair of opposed, substantially parallel transverse reinforcing elements interconnecting and reinforcing said side plates and formed integrally therewith and with said bottom frame; and

means connecting one of the transverse reinforcing elements of said channel unit to said one side plate of said tee unit with said channel unit side plates projecting on opposite sides of said opening centrally located in said one side plate of said tee unit.

4,124,325

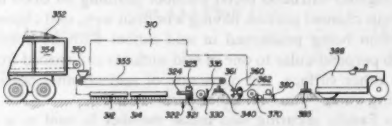
ASPHALT PAVEMENT RECYCLING APPARATUS

Earl F. Cutler, Lawrence, Kans., assignor to Cutler Repaving, Inc., Lawrence, Kans.

Continuation-in-part of Ser. No. 645,928, Dec. 31, 1975, abandoned. This application Aug. 12, 1977, Ser. No. 823,935

Int. Cl.[2] E01C *7/06*

U.S. Cl. 404—75 **14 Claims**



4. A method of restoring an asphalt roadway comprising the steps of: heating an upper layer of an existing roadway, scarifying the heated layer for obtaining a substantial quantity of loose existing road material, collecting the loose existing road material in a centralized windrow, spraying liquid asphalt upon the loose material, applying liquid rejuvenating material in addition to said liquid asphalt to the loose material, adding new asphalt mix to the windrow and thereafter pug-milling the loose existing material and new asphalt mix and rejuvenating material on the roadway, and spreading the mixed loose material and liquid asphalt on the roadway.

4,124,326

CUTTING INSERT WITH RAISED CUTTING EDGE

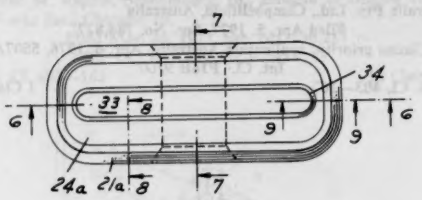
John C. Cost, Hazel Park, Mich., assignor to The Valeron Corporation, Oak Park, Mich.

Filed Jan. 3, 1977, Ser. No. 756,181

Int. Cl.[2] B26D *1/12*

U.S. Cl. 407—114 **18 Claims**

1. A cutting insert comprising a hard, wear resistant material, said insert having a cutting face including a continuous substantially flat surface, said cutting face having a raised peripheral negative rake cutting land extending entirely around said substantially flat surface and having an outer and inner margin, said insert having a pair of side and a pair of end walls, said walls being joined by arcuate corners and terminating at the outer margin of said negative rake cutting land and defining a continuous cutting edge, said walls extending normal to said substantially flat surface providing an obtuse included cutting angle, a sloping surface extending from the inner margin of said cutting land to said substantially flat surface and a chip control center island extending above said



substantially flat surface spaced from said cutting land and providing a more narrow flat surface at the end wall portion of said insert than at said side wall.

4,124,327

SPINDLE INERTIA CHANGING APPARATUS FOR MACHINING CENTER

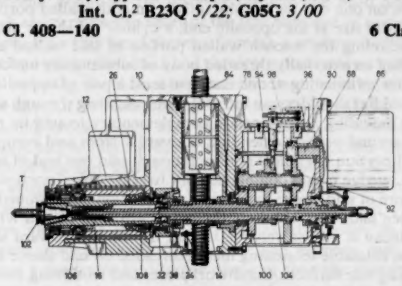
Motohiko Yoshida, and Nobuyuki Katagiri, both of Niwa, Japan, assignors to Kabushiki Kaisha Yamazaki Tekkosho, NIwa, Japan

Filed Mar. 30, 1977, Ser. No. 782,786

Claims priority, application Japan, Apr. 13, 1976, 51-42158

Int. Cl.[2] B23Q *5/22;* **G05G** *3/00*

U.S. Cl. 408—140 **6 Claims**



1. In combination, a spindle means for a machining center and having a main spindle and a tip spindle which are axially aligned and which have opposed splined ends and a coupling engaging the splined ends of the spindles for connecting the spindles, a flywheel freely rotatably mounted on said spindle means for rotation around said spindle means, said flywheel having a tapered concave conical clutch surface on one end thereof, a conical clutch body slidably mounted on one of said splined ends and having a tapered convex conical clutch surface engageable in mating engagement with the concave clutch surface on said flywheel, spring means connected between said coupling and said clutch body urging said clutch body away from said flywheel, and clutch actuating means connected to said clutch body for sliding said clutch body along said splined end for bringing the tapered conical clutch surface thereon into the tight clutching engagement with the clutch surface on said flywheel.

4,124,328

INDEXABLE INSERT DRILL

David Alan Hopkins, Detroit, Mich., assignor to The Valeron Corporation, Oak Park, Mich.

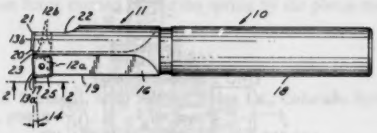
Filed Apr. 21, 1977, Ser. No. 789,354

Int. Cl.[2] B23B *51/00*

U.S. Cl. 408—223 **19 Claims**

1. An indexable insert drill comprising: a shank; a pair of pockets at one end of said shank, each formed for locating an indexable polygonal insert; one of said pockets having means for locating a first insert with a cutting edge extending from

the center of said drill obliquely to a transverse plane normal to the drill axis, with an inactive radially innermost edge, and with an inactive edge joining a radially outermost inactive bridging corner of said cutting edge; said other pocket having means for locating a second insert radially outward relative to



said first insert with a cutting edge extending obliquely to a transverse plane normal to the drill axis equally and oppositely to said first insert cutting edge in the same cone of revolution and with its radially outermost corner providing the radially outermost cutting element joining an inactive radially outermost edge.

4,124,329

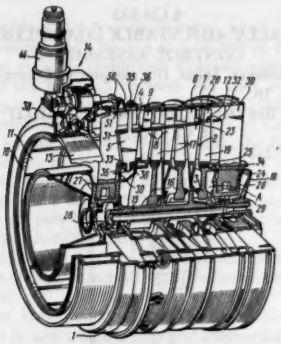
AXIAL-FLOW REVERSIBLE TURBINE

Viktor I. Romanov, Oktyabrsky prospekt, 38, kv. 6; Felix I. Kirzner, prospekt Lenina, 69, kv. 85, and Yakov K. Soroka, ulitsa Dekabristov, 38/2, kv. 4, all of Nikolaev, U.S.S.R.

Filed Nov. 30, 1976, Ser. No. 746,150

Int. Cl.[2] F01D *1/30*

U.S. Cl. 415—85 **4 Claims**



1. An axial-flow reversible turbine comprising: a casing; a nozzle assembly accommodated in said casing and having two-section blades for controlling the rate of flow of the working medium through said turbine; a wheel rotor with two-section blades for converting the kinetic energy of the flow of the working medium into mechanical work and mounted in the direction of the flow of the working medium after said nozzle assembly; one section of said blades of said nozzle assembly and of said wheel rotor forming the flow duct of the direct-rotating turbine and the other section of said blades of said nozzle assembly and said wheel rotor forming the flow duct of the counter-rotating turbine, the inside diameter of said flow duct of the counter-rotating turbine being larger than the outside diameter of said flow duct of the direct-rotating turbine; a valve in the form of variable-incidence airfoil vanes intended to deny access of the working medium into said flow duct of the direct-rotating turbine and located in said casing at the entrance into said flow duct; a cylindrical bushing with ports for intercommunicating said flow ducts and installed in said casing coaxially with said wheel rotor at the entrance of the flow into said flow duct before said nozzle assembly and having an inside diameter substantially equal to the outside diameter of said flow duct of the direct-rotating turbine; an entrance to said flow duct; a band sufficiently wide for overlapping said ports and arranged along the periphery of said bushing; a device for moving said band radially to at least two fixed positions in one of which it fits around the outside circumference of said flow duct of the counter-rotating turbine whereas in the other position it fits around the outside circumference of said entrance of said flow duct of the direct-rotating turbine, said device being installed on the external surface of said casing and connected with said band, said flow duct being a combination of the annular channel, nozzle vanes and turbine blades.

4,124,330

CAM-OPERATED PITCH-CHANGE APPARATUS

Philip E. Barnes, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

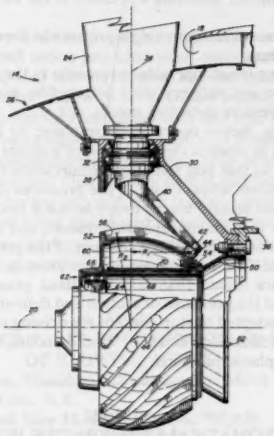
Filed Oct. 9, 1974, Ser. No. 513,346

Claims priority, application one,

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.[2] B64C *11/30*

U.S. Cl. 416—157 B **8 Claims**



1. A pitch-change apparatus for a ducted thrust fan having a plurality of variable pitch blades mounted on a fan hub for pivoting movement about the respective blade axes extending radially from the hub axis, comprising:

a plurality of pitch-change horns connected respectively to the plurality of variable pitch blades, each horn being connected with one blade for pivoting movement with the blade about the blade axis and projecting outwardly from the blade axis;

a camming ring mounted coaxially of the hub axis at an axially fixed station along the hub axis intercepted by the blade axes for rotation about the hub axis with the blades and relative to the blades, the ring defining on its periphery a plurality of helical camming grooves lying in a surface of revolution whose geometric center is located at the intersection of the blade axes and the hub axis;

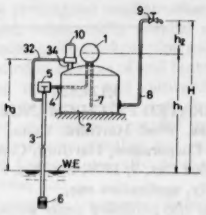
a plurality of cam followers mounted respectively on the plurality of pitch-change horns and engaging respectively the plurality of helical camming grooves on the periphery of the camming ring; and

rotary drive means connected in driving relationship with the camming ring for causing the ring to be rotated and blade pitch to be changed through the cooperative operation of the camming grooves on the ring and the cam followers on the pitch-change horns.

4,124,331
AUTOMATIC CONTROL SYSTEMS FOR A WELL PUMP INSTALLATION

Tomohiko Taki, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 30, 1976, Ser. No. 755,934
Int. Cl.[2] F04B *49/02*
U.S. Cl. 417—19 **9 Claims**



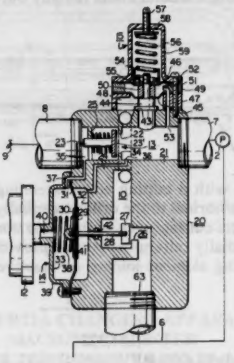
1. An automatic control system for a well pump installation comprising:
- first means for detecting a pressure at the suction side of the pump,
- second means for detecting a pressure at the delivery side of the pump,
- outputting means operable in response to the pressure of said suction and delivery sides detected by said first and second pressure detecting means, and
- switching means operable in response to said outputting means to control the operation of a motor for driving the pump so that said switching means starts the operation of said motor when a sum of the pressures detected by said first and second means drops below a first fixed pressure higher than an atmospheric pressure, and stops the operation of said motor when the sum of the pressures detected by said first and second means exceeds a second fixed pressure higher than said first fixed pressure and when both of the pressures of suction and delivery (a dry cut-off relay adapted to stop a motor for driving said pump when the pressures detected by said detecting means) are the atmospheric pressure.

4,124,332
AUTOMATICALLY OPERATIVE PUMPING EQUIPMENT

Masaru Nishijyo, Kadoma, Japan, assignor to Matsushita Electric Industrial Company, Limited, Japan

Filed May 18, 1976, Ser. No. 687,619
Claims priority, application Japan, May 19, 1975, 50/60385; Jun. 4, 1975, 50/76318[U]; Jun. 4, 1975, 50/76319[U]; Jun. 13, 1975, 50/80770[U]; Dec. 5, 1975, 50/145715; Dec. 5, 1975, 50/145716
Int. Cl.[2] F04B *49/08*
U.S. Cl. 417—26 **17 Claims**

1. Automatically operative pumping equipment comprising:
- a pump having a fluid delivery pipe and a fluid suction pipe;
- an electric motor operative to drive said pump for pumping fluid;
- a pressure switch positioned for sensing fluid pressure in said delivery pipe and operative to control said electric motor in response to the pressure in said delivery pipe;
- a by-pass passage branched off from said delivery pipe and connected to said suction pipe for defining a fluid flow path from said delivery pipe back to said suction pipe;
- a pressure regulator connected in said by-pass passage for controlling the flow rate through the by-pass passage by sensing the fluid pressure in the delivery pipe to maintain said pressure below a value which turns said pressure switch ON;
- a flow rate sensor for sensing the flow rate through the delivery pipe downstream from said by-pass passage branch and for producing a pressure signal representing same; and
- a by-pass passage flow rate regulator responsive to a control

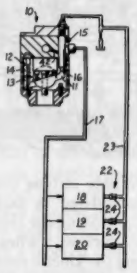


pressure signal and connected to said flow rate sensor to receive the flow rate sensor pressure signal for opening and closing the by-pass passage in response to the pressure signal from said flow rate sensor.

4,124,333
EXTERNALLY ADJUSTABLE LOAD PLUS PUMP CONTROL ASSEMBLY

Kenneth P. Liesener, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 12, 1977, Ser. No. 841,427
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—218 **3 Claims**



1. In a pump control assembly for moving a swash plate of a variable displacement pump between maximum and minimum discharge displacement positions, said assembly having first means for controlling the position of the swash plate, said first means having an actuating means connected to the swash plate and a valve member having first and second end portions, said valve member being movable between a first position at which a pump discharge pressure signal is in communication with the actuating means and a second position at which said pump discharge pressure signal is blocked from communication with the actuating means and the actuating means in in communication with a drain, said first end portion of the valve member having an end substantially continuously exposed to the pump discharge pressure signal and being responsive thereto for biasing the valve member toward one of the first and second positions, the improvement comprising:
- a spring connected to said valve member;
- means for selectively adjusting the preload on the spring for

selectively adjusting the minimum pump discharge pressure;

piston means for increasing the load on the spring for increasing the pump discharge pressure in response to a load pressure signal exceeding a preselected pressure level; and

an adjustable stop means for selectively adjusting the maximum force exerted on the the spring by the piston means.

4,124,334

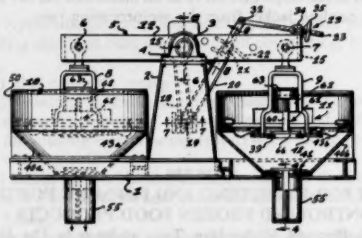
DIAPHRAGM PUMP

Flavio J. Mazzetti, 6580 Arequa Ridge La., Colorado Springs, Colo. 80919

Filed Dec. 30, 1976, Ser. No. 755,824

Int. Cl.[2] F04B *43/04*; F01B *31/14*; F04B *9/04, 23/04*

U.S. Cl. 417—480 **5 Claims**



1. In a double acting diaphragm pump, a pair of side by side chamber housings, each having an inlet and an outlet;

an annular pumping diaphragm disposed transversly across each of the housings between the inlet and outlet and dividing said housing into a suction chamber on the one side thereof and a discharge chamber on the other side;

first and second one-way valve means, the first being disposed in the housing inlet to admit fluid to the suction chamber, the second being disposed within the central opening of the annular pumping diaphragm and secured thereto to pass fluid from the suction chamber to the discharge chamber; and

reciprocably operable drive means attached to the diaphragm of each chamber housing wherein the drive means includes:

a rocker arm pivotally mounted for oscillatory motion about an axis which is disposed intermediate the centers of the diaphragms in the chamber housings,

connecting means secured to each of the said diaphragms and pivotally connected to the rocker arm;

eccentric means substantially coaxial with the axis of rotation of the rocker arm and having attached thereto and extending therefrom first and second pivotally interconnected drive arm; and

a movable interconnection between the second one of said drive arms and the rocker arm to impart oscillatory motion to the rocker arm.

4,124,335

INTERENGAGING GEAR MACHINE WITH COMPENSATING FORCE ON BEARING MEMBERS

Claus Jöns, Korntal; Erich Schönherr, Stuttgart, and Günter Wolff, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH. Stuttgart, Fed. Rep. of Germany

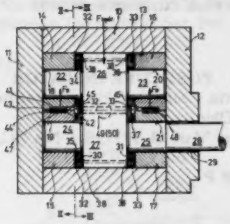
Filed Mar. 8, 1977, Ser. No. 775,587

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1976, 2610827

Int. Cl.[2] F01C *19/08, 21/02*

U.S. Cl. 418—73 **7 Claims**

1. In a gear-type fluid displacing machine, a combination comprising a pair of mating gears each having a pair of shaft portions at opposite axial ends of the respective gears; means for mounting said gears in the machine for rotation about respective axes, including a pair of bearing members for journalling each gear, each bearing member surrounding one of said shaft portions, and each bearing member of one of said gears being juxtaposed with a respective bearing member of the other of said gears and being subjected to forces which urge each bearing member of said one gear to move in direction generally toward the respective juxtaposed bearing member of said other gear during rotation of said gears; and counteracting means for opposing such forces and such relative movement of said juxtaposed bearing members toward each other, said counteracting means including a first recess provided in an outer surface of each bearing member of said one gear and a second recess provided in an outer surface of the respective juxtaposed bearing member and facing toward said first recess to define therewith between said bearing members a hole, means operatively associated with said hole to seal said hole, said hole being blind and provided with communicating means which communicates said blind hole solely with a source of a pressurized fluid medium so that said fluid medium flows from said source into said blind hole and accumulates in the latter without being discharged therefrom whereby a substantial compensating force is generated in said blind hole and urges said bearing members outwardly away from each other.



4,124,336

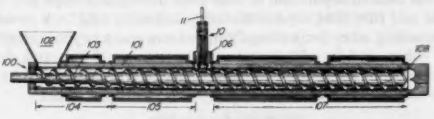
POPPET CHECK VALVE FOR CONTROLLED FEEDING OF BLOWING AGENT

David E. Johnson, Macedon, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 18, 1977, Ser. No. 797,976

Int. Cl.[2] B29D *27/00*

U.S. Cl. 425—4 C **11 Claims**



1. A check valve assembly adapted for controlling flow of a fluid blowing agent into an apparatus for the extrusion of polymeric foam resin, said valve comprising:

(a) a housing with an entry means on one end portion for feed of a fluid blowing agent into said housing, exit means on the opposite end portion of said housing for exiting of said blowing agent from said housing, and an enlarged chamber in said housing between said entry means and exit means;

(b) a conduit of reduced diameter, relative to the diameter of said exit means, positioned inside said housing in the vicinity of said exit means and having a valve seat formed thereon facing said exit means;

(c) a poppet valve stem extending through said conduit of reduced diameter into said chamber and having thereon a valve head, positioned at the extremity of said stem near-

est said exit means, said head being formed such that when in contact with said valve seat it forms a seal therewith;

(d) positioning means, disposed on the end of said valve stem opposite said valve head, adapted to position said valve stem radially within said chamber; and

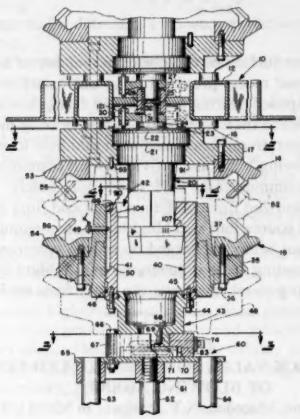
(e) tensioning means, disposed between said positioning means and said conduit of reduced diameter, adapted for holding said valve head firmly against said valve seat and responsive to the pressure of the fluid blowing agent entering said valve assembly such that said valve head is moved away from said valve seat when the pressure of the entering fluid is greater than the combined force exerted on the valve head by the tensioning means and the pressure within such extrusion apparatus.

4,124,337

POST CURE INFLATOR

Joseph M. Martin, Leetonia, Ohio, assignor to NRM Corporation, Akron, Ohio

Filed Mar. 29, 1977, Ser. No. 782,496
Int. Cl.[2] B29H *5/02*
U.S. Cl. 425—28 P **23 Claims**



1. A post cure tire inflator comprising a pair of separable tire bead engaging rims, means to move said rims adjacent each other to seat a tire therebetween for inflation, lock means to permit limited separation of said rims during inflaltion and to hold said rims thus separated during inflation, said lock means comprising a key projecting from one rim and a keyhole slot in the other, and interference means between said key and slot mechanically to preclude relative rotation between said key and slot except when said rims are adjacent each other.

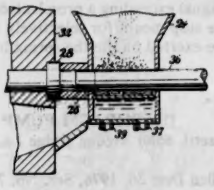
4,124,338

HOT BRIQUETTE PRESS

Robert D. Mitchell, Solon, Ohio, assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 3, 1977, Ser. No. 839,150
Int. Cl.[2] B30B *11/02*
U.S. Cl. 425—78 **4 Claims**

1. A briquetting system including a press having in combination a frame means, an anvil with a convex configuration supported by said frame means, a chip-box adapted to carry a quantity of hot metallic chips, a die assembly integral with and horizontally aligned with said chip-box, means for reciprocating the chip-box and die assembly on the frame from an advanced position where the die engages the anvil to a rectracted position where the die is spaced from the anvil, a water-cooling jacket subjacent said chip-box, a reciprocating ram movable through said chip-box and aligned die assembly to compress a quantity of metallic chips against the face of said anvil, and an imperforate wall intermediate the ram and the chip-box forming a clearance space in the chip-box between the reciprocating ram and the water-cooling jacket that is adapted to hold a quantity of loose chips that serve as an insulation barrier separating the cooling jacket from the reciprocating ram.

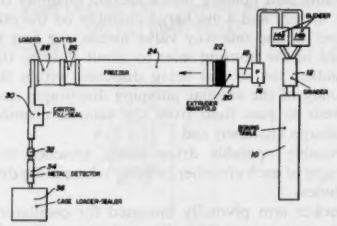


4,124,339

SYSTEM FOR EXTRUDING AND FORMING PORTION CONTROLLED FROZEN FOOD PRODUCTS

Vincent E. Bernard, Richardson, Tex., assignor to The Jimmy Dean Meat Company, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 526,146, Nov. 22, 1974, abandoned. This application Sep. 4, 1975, Ser. No. 610,301
Int. Cl.[2] A22C *11/00*; B29C *25/00*
U.S. Cl. 425—133.1 **13 Claims**



1. A system for forming a plurality of discrete products having preselected volumes and weights comprising:

means for receiving a quantity of semi-fluid material,

a pump connected to said receiving means to receive said material from said receiving means for pumping said material at a selected rate,

an extruder associated with said pump and having an inlet to receive said pumped material and having a plurality of outlets for outputting said pumped material,

a sealed bladder located between said pump and said extruder to sense the flow of said pumped material,

edible fluid within said bladder,

means operatively associated with and responsive to said edible fluid and connected for controlling said pump,

conduits connected to each of said outlets for conveying continuous lengths of said material,

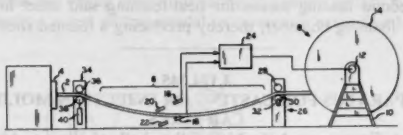
a chilling station located at the remote ends of said conduits for receiving said continuous lengths of said material and for chilling said continuous lengths to an extent that said lengths maintain their extruded cross-sections, and

means located at the outlet of said chilling station for periodically severing the chilled continuous lengths to form a plurality of products having the preselected volume and weight.

4,124,340
CONTROL OF PIPE TENSION BETWEEN EXTRUDER DIE AND TAKE-UP COILER

Ronald J. LaSpisa, Bartlesville, and Arthur H. McElroy, Tulsa, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 25, 1977, Ser. No. 762,550
Int. Cl.[2] B29D *23/04*; B29F *3/00*; B65H *25/22*
U.S. Cl. 425—135 **10 Claims**



1. Apparatus for extruding an elongated plastic pipe and for winding said pipe onto a winding roll comprising, in combination,

(a) pipe extrusion means;

(b) winding means comprising said winding roll, frame means for mounting said winding roll and motor means for rotating said winding roll to wind said pipe onto said winding roll;

(c) means for establishing and maintaining a slack segment in said pipe between said extrusion means and said winding means;

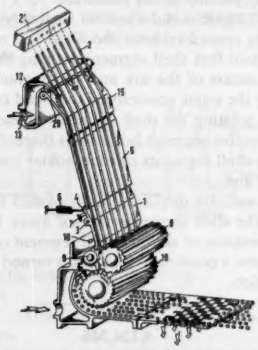
(d) sensing means for sensing the degree of slack in said slack segment; and

(e) control means for actuating said motor means responsive to said sensing means.

4,124,341
APPARATUS FOR COOLING AND GRANULATING STRANDS OF THERMOPLASTIC MATERIAL

Peter Locker, Goldbach, Germany, assignor to Automatik Apparate-Maschinenbau H. Hench Gesellschaft mit beschraenkter Haftung, Grossostheim, Germany

Filed Jun. 6, 1977, Ser. No. 803,687
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1976, 2627263
Int. Cl.[2] B29F *3/00*
U.S. Cl. 425—136 **6 Claims**

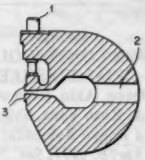


1. An apparatus for handling strands of thermoplastic material, comprising nozzle means for extruding said strands, strand handling means spaced below said nozzle means, chute means operatively interposed between said nozzle means and said strand handling means for guiding the strands from said nozzle means to said strand handling means, said chute means comprising a lower edge and a gate section located at said lower edge adjacent to said strand handling means, hinge means holding said gate section in a tiltable position, and switching sensor means located to respond to a tilting movement of said gate section for stopping the operation of said strand handling means and of said nozzle means thereby preventing damage to the strand handling means.

4,124,342
APPARATUS FOR CONTROLLING THE GAP BETWEEN LIPS OF A DIE FOR EXTRUDING A PLASTIC SHEET MATERIAL

Takeaki Akatsuka; Katsuichi Kitagawa; Hiroyoshi Amo, and Osamu Mita, all of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Division of Ser. No. 474,946, May 31, 1974, Pat. No. 3,985,845. This application Jun. 7, 1976, Ser. No. 693,362
Int. Cl.[2] B29D *7/02*
U.S. Cl. 425—141 **15 Claims**

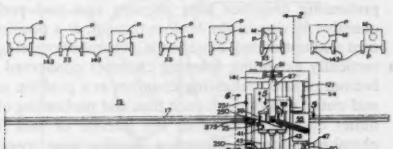


1. An apparatus for indicating the necessary amount of adjustment of a bolt, while controlling a gap between the lips of a die for extruding a plastic material, said gap being formed between a pair of die plates having a plurality n of adjusting bolts K_1, K_2, K_3 - - - K_n outside one or both of said plates, which apparatus comprises a calculator device having a setting means adjustable to simulate the setting X_1, X_2, X_3 - - - X_n of the transversely spaced bolts K_1, K_2, K_3 - - - K_n and their adjustment; a means for generating a y-output Y_1, Y_2, Y_3 - - - Y_n from the setting means of the cumulative effect of the settings X_1, X_2, X_3 - - - X_n, the *y*-output approximating the gap width at each individual bolt K; means for generating a *z*-output from the setting means of the contribution on the *y*-output Y_k at any bolt K of the settings X_{k+1}, X_{k+2} and X_{k+3}; and a means for measuring the actual gap width at each bolt K, so as to adjust said bolts by reference to the actual gap width and the effect of subsequent adjustment of the bolts.

4,124,343
INJECTION MOLDING DIVERS ARTICLES IN SELECTABLY ORDERED SEQUENCE

Charles L. Makinson, Akron; Kenneth C. Sutter, Uniontown, and David Z. Tyson, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 16, 1976, Ser. No. 714,885
Int. Cl.[2] B29F *1/00*
U.S. Cl. 425—145 **15 Claims**



1. Apparatus for injection molding a plurality of diverse articles in any selected sequence, the apparatus comprising a plurality of separate, independent, free-standing mold press

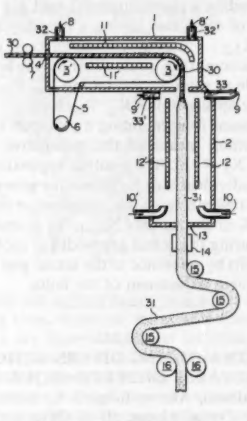
units disposed in linear array, means independently connected to each mold press unit operable to control the cure-time cycle of such mold press unit independently of any other of said mold press units, a track having spaced parallel rails extending adjacent to each of said mold press units, a carriage movable along said track, injection means supported on said carriage for movement to injection registry with a mold in any selected one of said mold press units from any other of said units, means operable to move said injection means comprising hydraulic power generating means fixed on said carriage and connected to supply fluid power for operating said injection means, and elevator means disposed on the carriage and supporting said injection means, said elevator means being operable to raise and to lower said injection means rectilinearly relatively of the carriage, and adjustable elevation stop means disposed on each of said mold press units, abutment means carried on said elevator means cooperable with said stop means on the respectively selected mold press unit to terminate vertical upward movement of said injector means.

4,124,344

APPARATUS FOR CONTINUOUSLY PRODUCING FOAMED SHEETS

Hiroshi Kiyono, Ohtsu; Akio Ishimoto, Kashihara; Yoichiro Noda, Saitama, and Kozo Yada, Shiga, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 6, 1977, Ser. No. 785,293
Claims priority, application Japan, Apr. 9, 1976, 51/40624
Int. Cl.[2] B29D *27/00*
U.S. Cl. 425—174.4 **16 Claims**



1. An apparatus for continuously producing a foamed sheet from a thermoplastic resin sheet containing a heat-decomposable blowing agent, said apparatus comprising:

a horizontally extending preheating chamber having an inlet end and an outlet end, said inlet end having therein a preheating chamber inlet opening and said preheating chamber having in the bottom thereof, at a position adjacent said outlet end, a preheating chamber outlet opening;

a vertically extending foaming chamber connected to said bottom of said preheating chamber at a position adjacent said outlet end thereof, such that said preheating chamber outlet opening opens into the interior of said foaming chamber and forms a foaming chamber inlet opening, and said foaming chamber having at the bottom thereof a foaming chamber outlet opening positioned vertically below said foaming chamber inlet opening;

conveyor means, positioned within said preheating chamber, for horizontally supporting and continuously conveying in a horizontal direction a thermoplastic resin sheet containing a heat-decomposable blowing agent from said preheating chamber inlet opening to a position above said preheating chamber outlet opening, and for then discharging said sheet downwardly so that said sheet passes vertically downwardly through said foaming chamber, such that said sheet passing downwardly through said foaming chamber is suspended from a downstream end portion of said conveyor means;

first heating means for heating said sheet in said preheating chamber to a temperature lower than the decomposition temperature of said blowing agent to thereby soften said sheet; and

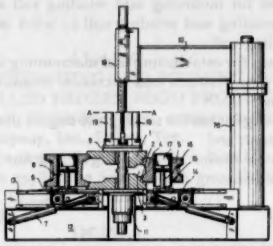
second heating means for heat-foaming said sheet in said foaming chamber, thereby producing a foamed sheet.

4,124,345

APPARATUS FOR CASTING OR INJECTION-MOLDING CAR TIRES

Erich Grunner, and Ewald Schaller, both of Vienna, Austria, assignors to Lim-Holding S.A., Luxembourg, Luxembourg

Filed Jun. 10, 1977, Ser. No. 805,466
Claims priority, application Austria, Jun. 11, 1976, 4303/76
Int. Cl.[2] B29F *1/00*; B29H *5/02, 5/08*
U.S. Cl. 425—183 **3 Claims**



1. A tire-molding apparatus comprising:

a support;

a pair of side wall shells spaced apart in axial direction and axially displaceable along a shell axis to define opposite outer side walls of a tire, said side wall shells being adapted to receive a tire-forming core between them;

a plurality of segment holders angularly spaced about said shell axis and rotatable about respective segment hold axes generally parallel to the tire axis;

a first shell segment and a second shell segment disposed in angularly spaced relation about the axis of each segment holder, said first shell segment defining the outer surface of the carcass of the tire and said second shell segment defining the outer contours of the tread of the tire;

means for rotating the shell segments of each holder about the respective segment holder axis thereof to successively turn the shell segments of each holder toward the axis of the tire; and

means for radially displacing each of said holders to draw one of the shell segments thereof away from a tire and enable rotation of another shell segment of the respective holder into a position in which it is turned toward the axis of said tire.

4,124,346

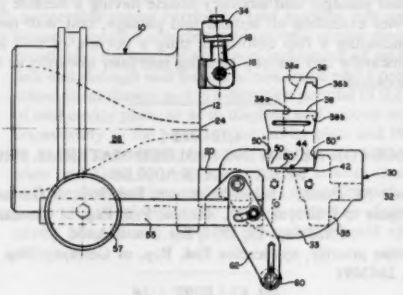
EXTRUDER DIE ARRANGEMENT

Alan Greenwood, Kent, Ohio, and Tim W. Doss, Union City, Tenn., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 674,457, Apr. 7, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,751
Int. Cl.[2] B29F *3/04*
U.S. Cl. 425—188 **2 Claims**

1. An extruder die arrangement comprising a die head having a vertical front face and a single passage for converting

flow from a single extruder barrel to a flow of cross-section of smaller height and greater width; a final profile die for forming a desired cross-section profile in the extruded product; and flow distribution means comprising a single elongated bar insert extending continuously in a direction of said greater width and having a workable surface exposed throughout its longitudinal extent to extrudate under pressure thereby changing the flow distribution pattern of extrudate issuing from said passage prior to its entry into the final die and independently of said final die; clamp means consisting of a single unitary member having a seat of trapezoidal cross-section extending horizontally from side to side thereof to accommodate said flow distribution means, a longitudinally extending recess positioning said final die, and an opening through said member accommodating movement of the extruded product in its desired cross-section profile freely outward from said profile die; and hinge means connecting said member to the die head to swing between a closed position securing said profile die outwardly between said member and said vertical face and an open horizontal position having both said distributing means and profile die retained therein only by their own weight and whence said flow distributing means can be freely lifted upwardly from said profile die and said member.



4,124,347

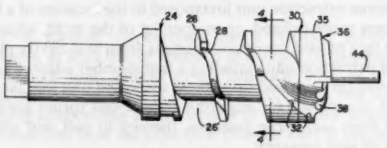
APPARATUS FOR FORMING SYNTHETIC LOGS

James F. Miller, P.O. Box 1142, Yakima, Wash. 98907

Filed Jul. 13, 1976, Ser. No. 704,932

Int. Cl.[2] B29D *23/04*

U.S. Cl. 425—208 **18 Claims**



1. A log-forming apparatus comprising

a feed passage,

a die chamber communicating with the forward end of said feed passage,

a feed auger disposed in said feed passage and having a helical screw flight for advancing loose particles along a feed channel formed by said screw-flight toward said die chamber;

said feed channel including a forward scoop section communicating with said die chamber,

said feed channel, including said scoop section, being of substantially constant volume; and

a replaceable tip at a forward end of said auger,

said tip including a forwardly facing pressure face for pressing the loose particles together into the shape of a log within said die chamber;

said helical screw flight including interruptions therealong to resist the formation of heat-generating backpressures in said feeding channel.

4,124,348

APPARATUS FOR PRODUCING VARIEGATED SOAP

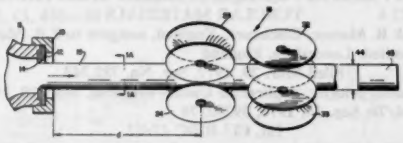
Charles F. Fischer, Jersey City, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 596,299, Jul. 16, 1975, Pat. No. 4,041,119.

This application Feb. 22, 1977, Ser. No. 770,451

Int. Cl.[2] B29C *17/14;* B29F *3/12*

U.S. Cl. 425—297 **7 Claims**



1. Apparatus for producing variegated soap bars having desired contoured striations comprising means for continually extruding a relatively warm plastic solid striated soap column for a plodder nozzle, said column comprising a soap of a base color having directional striations of a different color, means for peripherally gripping said moving column at a region located substantially immediately forwardly of said nozzle where the column retains its plasticity and ability to twist without deformation and there applying a predetermined torque for twisting the column about its longitudinal axis through a predetermined angle in a predetermined direction relative to its direction of movement from said nozzle while permitting substantially unimpeded longitudinal movement of said extruding column away from the nozzle, whereby to change the directional characteristics of said striations, and means downstream of said gripping means for subdividing the twisted column into blanks and pressing said blanks into soap bars exhibiting the directionally changed striations.

4,124,349

ROLLING MILL WITH TWO PRESS GAPS

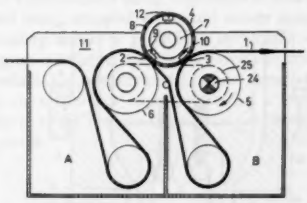
Rolf Lehmann, Rudolfstetten, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Nov. 23, 1977, Ser. No. 854,345

Claims priority, application Switzerland, Nov. 30, 1976, 015031/76

Int. Cl.[2] B29D *7/14;* D21F *3/00*

U.S. Cl. 425—367 **9 Claims**



1. Rolling mill for the pressure treatment of a web of material and having two press gaps in which independently adjusted application pressures can be developed, the mill comprising

a. a pressure equalization roll including a stationary axial supporting member having a horizontal axis, hydrostatic supporting elements which are mounted in the supporting member and are arranged in rows which extend along the

press gaps, and a shell which rotates about the supporting member and is supported thereon via the hydrostatic supporting elements, the shell being capable of moving in all radial directions relatively to the supporting member; and

b. two counter-rolls of the integral type having axes which lie in a common horizontal plane spaced vertically from the axis of the equalization roll, and which coact with the shell of the equalization roll to define the two press gaps,

c. the application pressure in each press gap being produced exclusively by the associated row of hydrostatic supporting elements of the pressure equalization roll.

4,124,350

APPARATUS FOR TRANSVERSELY STRETCHING TUBULAR MATERIALS

Frank B. Mercer, Blackburn, England, assignor to F.B. Mercer Limited, Lancashire, England

Filed Mar. 29, 1977, Ser. No. 782,343

Claims priority, application United Kingdom, Mar. 29, 1976, 12524/76; Sep. 24, 1976, 39702/76

Int. Cl.² B29C *17/02*

U.S. Cl. 425—393 **5 Claims**

1. Apparatus for transversely stretching a tubular material by continuously driving the material along an internal mandrel structure which increases in cross-section along its length comprising a mandrel structure including a hollow mandrel and a flexible endless sleeve toroidally embracing the mandrel, drive means associated with said mandrel structure downstream of the largest cross-section of the mandrel for frictionally driving the sleeve and tubular material which has been fed over the sleeve, along the outer surface of said mandrel.

4,124,351

APPARATUS FOR THE PRODUCTION OF BLOWMOLDED SYNTHETIC-RESIN BODIES

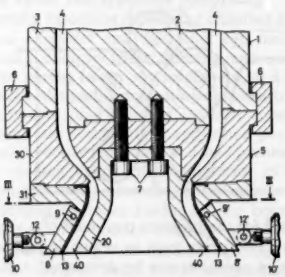
Franz Garbuio, Ettlingen-Schl., Germany, assignor to EL-BATAINER Kunststoff- und Verpackungsgesellschaft mbH, Ettlingen, Baden, Germany

Filed Mar. 14, 1977, Ser. No. 777,558

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1976, 2610668

Int. Cl.² B29D *23/03*

U.S. Cl. 425—532 **4 Claims**



1. An apparatus for the blow-molding of a hollow body comprising:

an extruder for displacing thermoplastic material;

a nozzle head connected with said extruder for forming a parison from the displaced material;

a blow mold receiving said parison for the blowing thereof to produce said body;

an auxiliary nozzle mounted on said head and formed with a nozzle passage traversed by the thermoplastic material forming said parison; and

wall means juxtaposed with only a portion of the periphery of said parison and displaceable into said passage to partially obstruct the same and reduce the wall thickness of the parison at a corresponding location for a predetermined time interval during the formation of the parison corresponding to the displacement of said wall means into said passage, said auxiliary nozzle having a flexible steel liner extending all around said passage, said wall means including a flap deforming only a portion of said liner inwardly and thereby bending said liner inwardly at said location.

4,124,352

DEVICE FOR REMOVING MOLDED MATERIAL FROM MULTI-PLATE MOLDS

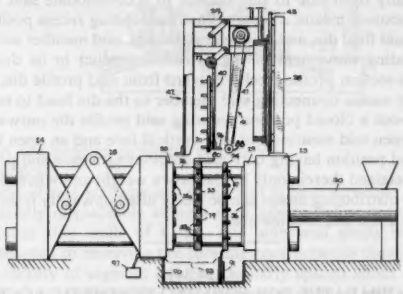
Lambert M. Pasch, Aachen-Nuetheim, Fed. Rep. of Germany, assignor to Uniroyal A. G., Aachen, Fed. Rep. of Germany

Filed Sep. 15, 1977, Ser. No. 833,406

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1976, 2642691

Int. Cl.² B29F *1/14*

U.S. Cl. 425—556 **45 Claims**



1. A device for removing molded material, in the form of molded articles and cured sprues, from the mold cavities provided in a mold cavity plate and the sprue passages provided in a mold cover plate, respectively, of a separable multi-plate mold; said device comprising:

A. a sprue extraction unit juxtaposed to the location of a first access space defined, upon opening of the mold, adjacent the face of said cover plate remote from said cavity plate, said extraction unit including a first member adapted to be moved through said first access space and past said face of said cover plate for engaging ends of said sprues projecting from said sprue passages, thereby to pull said sprues out of said passages;

B. a molded article ejection unit juxtaposed to the location of a second access space defined, upon opening of the mold, between said cavity and cover plates, said ejection unit comprising a second member adapted to be moved through said second access space both parallel and transversely to the plane of said cavity plate and having a plurality of ejector elements, identical in number and distribution to said mold cavities, which are directed toward said cavity plate upon location of said second member in said second access space and opposite said cavity plate;

C. a molded article guide unit juxtaposed to the location of a third access space defined, upon opening of the mold, adjacent the face of said cavity plate remote from said cover plate, said guide unit comprising a third member

adapted to be moved through said third access space into closely confronting relation with said cavity plate, said third member being hollow and having an opening at a face thereof which, upon location of said third member in said third access space and opposite said cavity plate, is directed toward said cavity plate so as to enable the latter and said third member cooperatively to define an enclosure for receiving ejected molded articles;

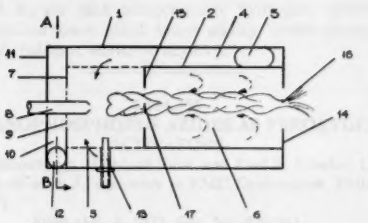
D. means operatively associated with said extraction unit, said ejection unit and said guide unit for moving said extraction, ejection, and guide units jointly and generally linearly parallel to the planes of said cavity and cover plates into and out of said access spaces, respectively, when the same are formed upon opening of the mold; and

E. cooperable means carried by said ejection unit and stationarily located adjacent said second access space, respectively, for interacting, upon movement of said ejection unit through said second access space past a predetermined point therein and in a direction parallel to the plane of said cavity plate, so as to displace said second member transversely to the plane of said cavity plate and thereby to enable said ejector elements to approach said cavity plate and eject the respective molded articles from said mold cavities and into said enclosure during inward movement of said ejection unit and to withdraw from said cavity plate during outward movement of said ejection unit.

4,124,353
METHOD AND APPARATUS FOR CARRYING OUT A REACTION BETWEEN STREAMS OF FLUID

François Prudhon, Saint-Auban, and Augustin Scicluna, Salindres, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Continuation of Ser. No. 590,812, Jun. 27, 1975, abandoned.
This application Feb. 18, 1977, Ser. No. 770,053
Int. Cl.[2] F23C *5/00*
U.S. Cl. 431—8 **13 Claims**

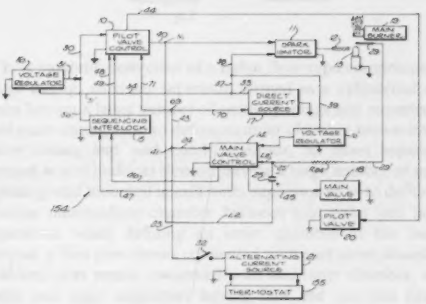


1. A method for carrying out a reaction between fluid streams, at least one of which is in a vapor or gaseous state, in a reaction zone defined by a cylindrical wall, in which the reaction is carried out in a region remote from said wall, comprising introducing a fluid stream of one of the reactants into the reaction zone for axial flow from an inlet at one end of the reaction zone toward an outlet at the other end, introducing the stream of fluid in the vapor or gaseous state for helicoidal symmetrical flow about the outside of the cylindrical wall in the direction towards the inlet end, causing most of the gas in helicoidal flow to flow through openings in the wall adjacent the inlet for continued flow into and through the reaction zone in helical paths about the axial stream and in the same axial direction, enabling the fluid of the axial stream to intermix with vapor or gas from the adjacent portion of the helical stream during continued flow through the reaction zone for reaction while the helical stream confines the reaction to a region remote from the wall.

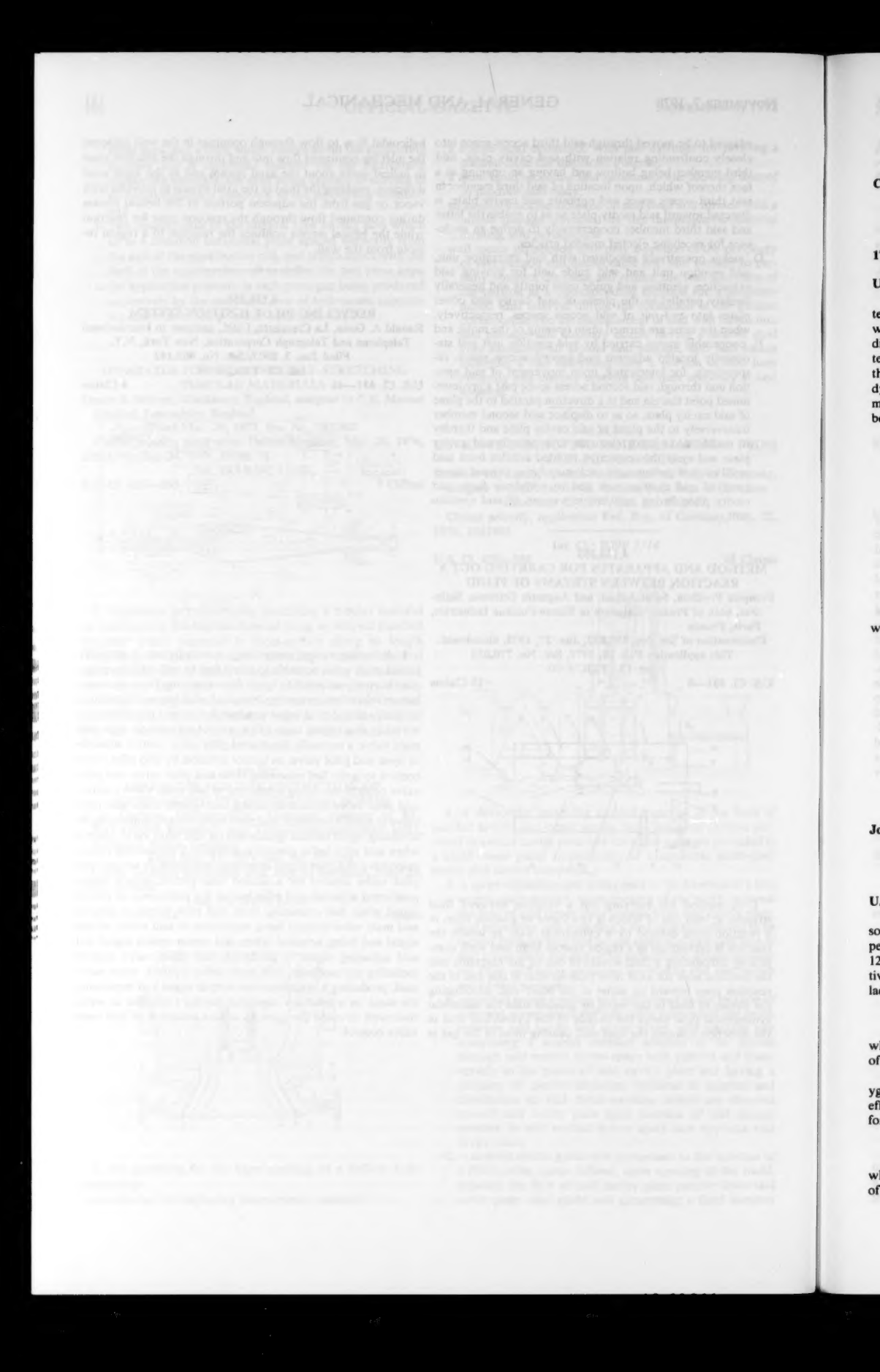
4,124,354
RECYCLING PILOT IGNITION SYSTEM

Ronald A. Gann, La Crescenta, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jun. 3, 1977, Ser. No. 803,142
Int. Cl.[2] F23Q *9/08*
U.S. Cl. 431—46 **4 Claims**



1. A heating system comprising: a main burner, a normally closed main valve actuable to admit fuel to said main burner; a pilot burner positioned to ignite fuel emanating from said main burner when fuel emanating from said pilot burner is ignited; a normally closed pilot valve to admit fuel to said pilot burner; a normally deactuated main valve control actuable to open said main valve; a normally deactuated pilot valve control actuable to open said pilot valve; an ignitor actuable by said pilot valve control to ignite fuel emanating from said pilot valve, said pilot valve control also being connected to said main valve control, said pilot valve control actuating said ignitor when said pilot valve control is actuated, said pilot valve control impressing an actuating signal on said ignitor and on said main valve control when said pilot valve control is actuated; a sequencing circuit responsive to a start signal impressed thereupon to actuate said pilot valve control for a limited time period; sensor means positioned adjacent said pilot burner for producing an output signal when fuel emanating from said pilot burner is ignited, said main valve control being responsive to said sensor means signal and being actuated when said sensor means signal and said actuating signal is produced, said main valve control including an oscillator, said main valve control, when actuated, producing a predetermined output signal and impressing the same on a feedback capacitor having a rectifier in series therewith to cause the same to sustain actuation of said main valve control.



4,124,355

TRANSFER DYEING WITH 1-AMINO-4-ANILINOANTHRAQUINONE DYES

Colin W. Greenhalgh; David F. Newton; Richard Budziarek, and Howard Clarke, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

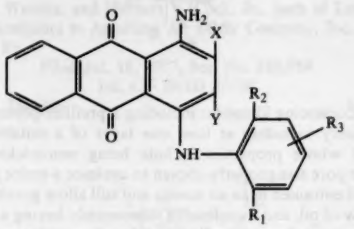
Filed Mar. 17, 1978, Ser. No. 887,854

Claims priority, application United Kingdom, Apr. 25, 1977, 17131/77

Int. Cl.[2] D06P *5/00*

U.S. Cl. 8—2.5 A 8 Claims

1. A process for the transfer color printing of synthetic textile materials which comprises placing a transfer material which carries a colored pattern, derived from one or more disperse anthraquinone dyestuffs, in contact with a synthetic textile material and heating the transfer material and the synthetic textile material whilst in contact so as to transfer the dyestuff from the transfer material to the synthetic textile material, the disperse anthraquinone dyestuff or dyestuffs being of the formula:



wherein

X and Y are each independently hydrogen, optionally substituted lower alkyl, lower alkoxy, lower alkylmercapto or an electron-withdrawing group;

R_1 is optionally-substituted lower alkyl, lower alkoxy, lower alkoxycarbonyl, halogen, nitrile or acyloxy and

R_2 and R_3 are each independently hydrogen, optionally substituted lower alkyl, lower alkoxy, lower alkoxycarbonyl, halogen, nitrile or acyloxy.

4,124,356

ORGANOPHOSPHORUS AZIDES AS PEROXYGEN ACTIVATORS

John H. Blumbergs, Highland Park, and Fred R. Scholer, Cranbury, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Oct. 3, 1977, Ser. No. 838,901

Int. Cl.[2] D06L *3/02;* C11D *7/54*

U.S. Cl. 8—111 15 Claims

1. A process for the low temperature bleaching of stained or soiled fabrics which comprises treating them with an aqueous peroxygen bleaching solution having a pH of about 6 to about 12 and containing as a peroxygen activator therefor, an effective amount of an organophosphorus azide having the formulae:

$$RR_1P(O)N_3 \text{ and } ROR_1OP(O)N_3$$

wherein R and R_1 are each selected from the group consisting of phenyl radicals and alkyl radicals of to 18 carbon atoms.

8. A bleaching composition consisting essentially of a peroxygen bleaching compound and as a peroxygen activator, an effective amount of an organophosphorus azide having the formulae:

$$RR_1P(O)N_3 \text{ and } ROR_1OP(O)N_3$$

wherein R and R_1 are each selected from the group consisting of phenyl and alkyl radicals of 1 to 18 carbon atoms.

4,124,357

CATALYTIC CONVERTER OF A RADIAL FLOW TYPE

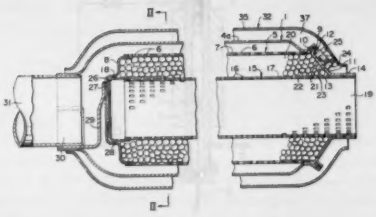
Tadao Akimoto, Toyota, and Eiji Hiramatsu, Nukata, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Jul. 28, 1977, Ser. No. 820,008

Claims priority, application Japan, Apr. 28, 1977, 52/54624

Int. Cl.[2] F01N *3/15;* B01J *8/02*

U.S. Cl. 422—181 13 Claims



1. A catalytic converter of a radial flow type comprising an outer casing, an outer separator formed as a cylindrical element having a large number of small openings and mounted in said outer casing so as to define an outer chamber between said outer casing and said outer separator, an inner separator formed as a cylindrical element having a large number of small openings and mounted in said outer separator so as to define an annular intermediate chamber between said outer and inner separators while defining an inner chamber at the inside thereof, a first port means connected with said outer chamber, a second port means connected with said inner chamber, said outer and inner separators having first end portions firmly connected with said outer casing and mutually telescoping closed second ends, an L-shaped flexible support plate element having a first end portion connected with said outer casing and a second end portion connected with said second end portion of said outer separator, thereby directly supporting said second end portion of said outer separator from said outer casing in radial and axial directions while permitting relative displacement of the outer separator with respect to the outer casing both in the radial and the axial directions so as to relieve thermal stress, and catalyst material charged in said annular intermediate chamber.

4,124,358

SAMPLE-INJECTION DEVICE FOR PROCESS GAS CHROMATOGRAPHY WITH CAPILLARY COLUMNS

Friedhelm Müller, Linkenheim-Hochstetten, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 21, 1977, Ser. No. 789,459

Claims priority, application Fed. Rep. of Germany, May 11, 1976, 2620756

Int. Cl.[2] B01D *15/08*

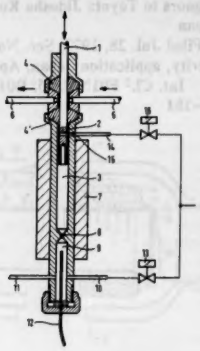
U.S. Cl. 55—67 8 Claims

1. In a sample injection device for process gas chromatography with capillary columns, using a heated evaporation chamber which receives the sample and from which the sample enters the column via a split chamber, and including a narrow, nozzle shaped opening separating the evaporation chamber from the split chamber and a carrier gas source, the improvement comprising:

a. a first valve for connecting said carrier gas source to said evaporation chamber; and

b. a second valve for connecting said carrier gas source to said split chamber, whereby said second valve may be open and said first valve closed during evaporation of the

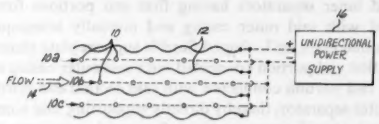
sample in the evaporation chamber whereafter said first valve can be opened and said second valve closed to transport evaporated sample to said split chamber thereby injecting it into the capillary column.



4,124,359
ELECTROSTATIC PRECIPITATOR

Edward W. Geller, Mercer Island, Wash., assignor to Flow Industries, Inc., Kent, Wash.

Filed May 2, 1977, Ser. No. 792,653
Int. Cl.[2] B03C *3/45*
U.S. Cl. 55—130 **6 Claims**

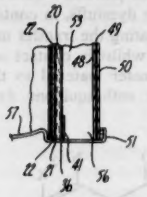


1. Electrostatic precipitator apparatus operable to capture particles borne by gas flowing in a selected direction through said apparatus, comprising mutually opposed first and second collector plate electrodes mounted in spaced parallel relationship defining therebetween a laterally confined path for said directional flow of gas through the apparatus, said collector plate electrodes being of similarly corrugated surface form arranged with the alternate smoothly curved crests and valleys of each in direct opposition to the corresponding crests and valleys of the other and longitudinally extending substantially at right angles to the direction of said gas flow between said collector plate electrodes, an array of parallel successively spaced discharge filament electrodes mounted midway between and extending in parallel relationship with said collector plate electrodes with the individual discharge filament electrodes extending centrally lengthwise of individual divergence-convergence spaces defined by and between opposing valleys of said collector plate electrodes, the corrugation wave length of said collector plate electrodes in relation to the corrugation height and mean spacing between said collector plate electrodes being such as to place the discharge filament electrodes at approximately uniform spacing from the valley-defining surfaces respectively adjacent thereto, and means for applying unidirectional voltage to said electrodes including connections of one polarity to said collector plate electrodes in common and connections of opposite polarity to said discharge filament electrodes in common, the mean spacing between said mutually opposing collector plate electrodes being substantially one-half to one times the corrugation wave length of said collector plate electrodes and the height of said corrugations between valley and crest peaks being between substantially ten and twenty percent of said wave length.

4,124,360
COALESCING DEMISTER

L. Joseph Berger, Jr., Birmingham, and Denis D. Guequierre, Livonia, both of Mich., assignors to Finite Filter Co., Inc., Madison Heights, Mich.

Continuation-in-part of Ser. No. 593,831, Jul. 7, 1975, Pat. No. 4,078,965. This application Jul. 23, 1976, Ser. No. 708,061
Int. Cl.[2] B01D *19/00*
U.S. Cl. 55—187 **22 Claims**

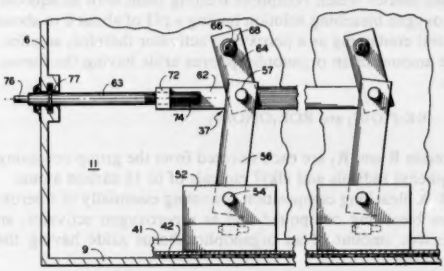


1. A Coalescing Demister including a prefilter-precoalescer subassembly including at least one layer of a suitable filter material whose properties include being non-wicking and having a pore size properly chosen to coalesce a major portion of the oil entrained in an air stream and still allow gravitational backflow of oil, and a coalescing subassembly having a proper pore size to coalesce virtually all of the oil particles remaining in said air stream after passing through said prefilter-precoalescer subassembly and being concentrically located with respect to said prefilter-precoalescer subassembly and having a physical air gap there between, and having said subassemblies potted between upper and lower end caps to seal the edge regions of said subassemblies to prevent air leakage and to maintain said air gap and including an air flow barrier mounted in an appropriate position on the lower periphery of said coalescing subassembly and having at least one reservoir formed between said air flow barrier and said prefilter-precoalescer subassembly to collect oil and aid said gravitational backflow of oil.

4,124,361
SEALING DEVICE FOR FILTER CELLS

Alan E. Revell, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed May 11, 1977, Ser. No. 795,892
Int. Cl.[2] F16L *37/20*; B10D *39/00*
U.S. Cl. 55—493 **5 Claims**



1. In a flow-through filter cell support housing adapted to receive and support filter cell means disposed between a dirty gas inlet passage and a clean gas outlet passage with peripheral

edges of the filter cell means abutting against an aligned peripheral seal mounted around one of the passages, an improved filter cell sealing and retaining means comprising:

a toggle joint support member longitudinally extending through said housing;

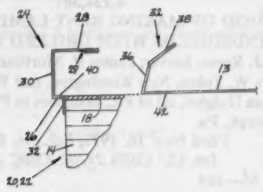
a plurality of toggle joints spaced apart along the longitudinal axis of said toggle joint support member, each toggle joint having a pair of link members joined together at one end at a knee portion and pivotally connected to said toggle joint support member at said knee portion, and each toggle joint being pivotally mounted at one end of one of its link members to the frame of the filter cell support housing; and, engaging means attached to one end of the other toggle joint link member engageable with the filter cell means upon longitudinal movement of the toggle support member.

4,124,362

SNAP TOGETHER HEADER AND CELL SIDE ASSEMBLY

Karl L. Westlin, and Herbert V. Cork, Jr., both of Louisville, Ky., assignors to American Air Filter Company, Inc., Louisville, Ky.

Filed Jul. 18, 1977, Ser. No. 816,589
Int. Cl.[2] B01D *27/08*
U.S. Cl. 55—509 **4 Claims**



1. A unit filter assembly comprising:

a peripheral filter frame having upstream and downstream peripheral edges defining open upstream and downstream faces, respectively, to permit fluid flow therethrough;

a filter media disposed within the filter frame transverse the direction of fluid flow between the open upstream and downstream faces of the peripheral filter frame;

a first border flange attached to the upstream edge of the peripheral filter frame, the first border flange having a generally U-shaped transverse cross-section defined by a base leg portion and a pair of opposed inner and outer leg portions extending therefrom, the base leg portion extending therefrom, the base leg portion extending outwardly of the upstream peripheral edge of the peripheral filter frame with the outer leg portion extending in spaced substantially parallel relationship to the side wall of the filter frame, the inner leg portion of the first border flange having a terminal filter media retaining portion extending normal therefrom and in abutment with the periphery of the filter media at the open upstream face of the filter frame to restrain the filter media in the filter frame; and,

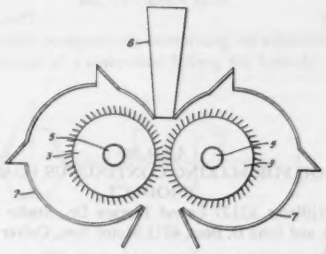
first clamping means comprising a base leg integrally formed with and projecting obliquely outwardly from the upstream edge of the filter frame at an acute angle to the side wall of the filter frame; and, an outer leg projecting obliquely from the projecting end of the base leg at an obtuse angle to the base leg and extending in a direction generally back over the side wall of the filter frame, the first clamping means being wedged into the U-shaped motor flange of the opening between the inner and outer leg portions thereof such that the surface of the inner leg portion interior to the U-shaped cross-section of the first border flange is in parallel abutment with the side wall of the peripheral filter frame adjacent the upstream edge of the filter frame and the free end of the outer leg of the first clamping means is in tight abutment with the outer leg of the first border flange to maintain the first border flange in tight fixed position on the filter frame.

4,124,363

METHOD AND APPARATUS FOR MANUFACTURING INORGANIC FIBER THROUGH PENDENT PROCESS AND APPARATUS FOR CARRYING OUT THE SAME

Motochika Kawai, Fujisawa, Japan, assignor to Japan Inorganic Material Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 749,693, Dec. 13, 1976, abandoned, which is a continuation-in-part of Ser. No. 575,532, May 8, 1975, abandoned, which is a continuation of Ser. No. 468,288, May 8, 1974, abandoned. This application Aug. 15, 1977, Ser. No. 824,653
Int. Cl.[2] C03D *37/02*
U.S. Cl. 65—2 **2 Claims**



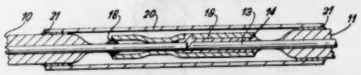
2. An apparatus for manufacturing glass fibers comprising a heating furnace for melting a waste glass material, the furnace having many nozzle holes perforating through the bottom plate thereof, the nozzle holes being arranged in rows; a guide member disposed immediately below said nozzle holes to suspend therefrom, the guide member having a water cooling arrangement for both side walls thereof and having a plurality of air blowing ports arranged in steps to form thin layers of air curtains covering the inner wall faces of the guide member; a pair of rolls which form a nipping part between them immediately below the lower end of the guide member and each of which is provided with a plurality of tilting vanes evenly spaced thereon, each roll rotating at a high speed in opposite directions so as to advance fibers through the nipping part; covers surrounding said rolls respectively with annular clearance left between the outer circumferences of the rolls and the covers, the covers having openings at the nipping part between the rolls and the covers being arranged to be in contact with the lower end walls of said guide member; and an endless conveyer provided with a suction mechanism.

4,124,364

METHOD FOR MAKING GLASS SLEEVE FIBER SPLICE

David G. Dalgoutte, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 2, 1976, Ser. No. 746,903
Int. Cl.[2] C03B *37/00*
U.S. Cl. 65—4 B 7 Claims



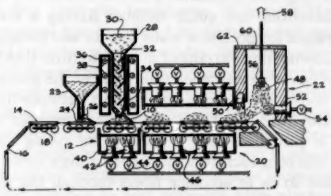
1. A method of butt joining a pair of glass optical fibres which method includes the steps of introducing a bare end of one member of the pair of optical fibres into one end of a glass sleeve having a melting point lower than that of the fibre and a bore that is a clearance fit over the bare fibre, of heating the sleeve in the region intermediate said one end of the sleeve and the end of the fibre so as to collapse said region on to the fibre and to cause said collapsed region to propagate to substantially the end of the fibre, of introducing the end of the outer member of the pair of optical fibres into the other end of the sleeve, and of securing the two fibres in substantially butting relationship with an index matching medium between their ends, said index matching medium being an ultra-violet curing adhesive also being disposed to secure said other member to said sleeve after being exposed to ultra-violet light.

4,124,365

METHOD FOR MAKING CONTINUOUS FOAM GLASS PRODUCT

Tudor Williams, 12127 Laurel Terrace Dr., Studio City, Calif. 91604, and John D. Bost, 4372 Motor Ave., Culver City, Calif. 90230

Division of Ser. No. 641,810, Dec. 17, 1975, Pat. No. 4,038,063.
This application May 5, 1977, Ser. No. 794,283
The portion of the term of this patent subsequent to Jul. 26, 1994, has been disclaimed.
Int. Cl.[2] C03B *19/08*
U.S. Cl. 65—22 4 Claims



1. A moldless process for the manufacture of cellular ceramic product in which a foaming agent is added to a ceramic feed, said foaming agent requiring a temperature in excess of 500° C. for activation, comprising:

heating said ceramic feed to a temperature of at least 500° C. but which is lower than said activation temperature;

thereafter, adding foaming agent to said heated ceramic feed to form a mixture thereof;

heating said mixture of foaming agent and heated ceramic feed to said activation temperature for a time sufficient to form foamed ceramic therefrom; and

drawing said foamed ceramic to form said product.

4,124,366

Patent Not Issued For This Number

4,124,367

METHOD OF MAKING BENT LAMINATED GLASS WINDSHIELDS WITH DRILLED APERTURES

Thomas J. Reese, Sarver; James R. Mortimer, Natrona Heights; Melvin W. Tobin, New Kensington, and W. Robert Gray, Jr., Natrona Heights, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 16, 1977, Ser. No. 852,115
Int. Cl.[2] C03B *23/02;* C03C *27/12*
U.S. Cl. 65—104 8 Claims

1. A method of making a bent, laminated, safety glass windshield comprising a pair of glass sheets laminated to a layer of plastic interlayer material and having at least one aperture extending through the thickness of said laminated windshield in spaced relation to a marginal portion thereof comprising performing the following steps in sequence:

(a) drilling at least one aperture through the thickness of a first flat glass sheet,

(b) drilling at least one corresponding aperture through the thickness of a second flat glass sheet in such a position that it will be aligned with said corresponding aperture of said first flat glass sheet after said two sheets are aligned in superimposed position and bent simultaneously,

(c) assembling said flat glass sheets in superimposed aligned position over one another and mounting said assembly so formed over an outline bending mold of the gravity sagging type having an upward facing shaping surface conforming to the shape desired for said glass sheets,

(d) heating said glass sheet assembly to at least the deformation temperature of the glass and not above 1150° F. (677° C.) in the vicinity of said aperture whereby the glass sheets sag to form shaped glass sheets having controlled shapes corresponding to the shaping surface of said bending mold,

(e) cooling said shaped glass sheets, controlling said cooling in the range from about 1100° F. (593° C.) to about 900° F. (482° C.) to a rate of cooling of between 1° F. (0.5° C.) and 3° F. (1.7° C.) per second, thereby establishing a compression stress in the periphery of said holes while avoiding the establishment of temporary tension stresses in said hole periphery that would cause the glass to break in the vicinity thereof, and

(f) laminating said shaped glass sheets to an interlayer composed of polyurethane or polyvinyl acetal.

4,124,368

INSENSITIVE AMMONIUM NITRATE

Carl Boyars, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 1, 1976, Ser. No. 728,819
Int. Cl.[2] C06B 45/00
U.S. Cl. 71—59 10 Claims

1. The method of reducing the danger of the accidental detonation of large masses of commercial ammonium nitrate during handling and storing under normal climatic conditions comprising substituting a solid solution of potassium nitrate in form III ammonium nitrate for said ammonium nitrate wherein the potassium nitrate constitutes from more than zero to less than 50 weight percent of the solid solution.

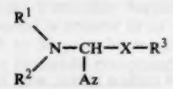
4,124,369

COMBATING FUNGI AND CONTROLLING PLANT GROWTH WITH 1-AMIDO-1-AZOLYL-2-HYDROXY- OR -KETO-ALKANES

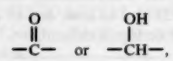
Wolfgang Krämer; Wilfried Draber; Karl H. Büchel, all of Wuppertal; Wilhelm Brandes, Cologne, and Klaus Lürssen, Bergisch-Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 19, 1977, Ser. No. 798,745
Claims priority, application Fed. Rep. of Germany, Jun. 1, 1976, 2624529
Int. Cl.[2] A01N 9/22; A61K 31/41, 31/415; C07D 249/08
U.S. Cl. 71—76 9 Claims

1. A 1-amido-1-azolyl-2-hydroxy- or -keto-alkane of the formula



in which X is



R^1 is phenyl, phenyl substituted by at least one halogen or alkyl with 1 or 2 carbon atoms,
R^4 —SO_2— or R^5—CO—,
R^2 is hydrogen, or
R^1 and R^2 conjointly with the linking nitrogen atom are phthalimide,
R^3 is alkyl with 1 to 4 carbon atoms, phenyl, or phenyl substituted by at least one halogen or alkyl with 1 or 2 carbon atoms,
R^4 is alkyl with 1 to 4 carbon atoms, halogenoalkyl with up to 2 carbon atoms and up to 5 halogen atoms, cycloalkyl with 5 to 7 carbon atoms optionally substituted by alkyl with 1 or 2 carbon atoms, or aryl, aralkyl or aryloxyalkyl each with 6 to 10 carbon atoms in the aryl part and the last two each having up to 4 carbon atoms in the alkyl part, which alkyl part is optionally substituted by halogen whereas the aryl part of these three radicals optionally carries a substituent selected from the group consisting of halogen, alkyl with 1 to 4 carbon atoms, halogenoalkyl with up to 2 carbon atoms and up to 4 halogen atoms, methoxy, ethoxy, methylthio, ethylthio, nitro, cyano, phenyl, halophenyl, phenoxy and halophenoxy,
R^5 is alkyl with 1 to 4 carbon atoms, and Az is imidazol-1-yl, 1,2,4-triazol-1-yl, 1,2,4-triazol-4-yl or 1,2,3-triazol-1-yl or a physiologically tolerated salt thereof.

7. A method of combating fungi or regulating the growth of plants which comprises applying to the fungi, to the plants, or to a habitat thereof, a fungicidally or plant growth-regulating effective amount of a compound according to claim 1.

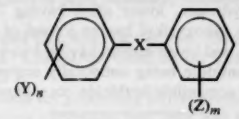
4,124,370

DIPHENYL ETHERS FOR TOBACCO SUCKER CONTROL

Pyung K. Yu, Doylestown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed May 8, 1975, Ser. No. 575,666
Int. Cl.[2] A01N 5/00
U.S. Cl. 71—78 13 Claims

1. A method for controlling the growth of suckers in growing tobacco plants which comprises applying to the plants an effective amount of a compound of the formula



wherein
X is an oxygen atom or a sulfur atom each Y and each Z independently is a halogen atom, a (C_1–C_8) alkyl group, a trifluoromethyl group, a (C_1–C_4) alkoxy group, a hydroxy group, a nitro group, a cyano group, a carboxy group, a carb(C_1–C_4)-alkoxy group, a carbamoyl group, a carb(C_1–C_4)-alkyl or (C_1–C_4)-dialkyl carbamoyl group, or a (C_1–C_4)-alkylthio group,
m is 0, 1,2,3, and
n is 0, 1,2,3.

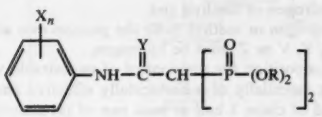
4,124,371

α,α-DIPHOSPHONATO ACETANILIDES

William D. Dixon, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 495,959, Aug. 9, 1974, Pat. No. 3,906,062. This application Mar. 3, 1975, Ser. No. 554,803
Int. Cl.[2] A01N 9/36
U.S. Cl. 71—87 6 Claims

1. Herbicidal compositions comprising an adjuvant and an effective amount of a compound having the formula



wherein:
X is halogen, CN, NO_2, NH_2 or mineral acid salt thereof;
n is an integer from 0–5;
Y is oxygen or sulfur and the
R's are alkyl groups having from 1–10 carbon atoms.

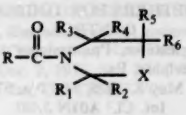
4,124,372

HERBICIDAL ANTIDOTE COMPOSITIONS WITH SUBSTITUTED OXAZOLIDINES AND THIAZOLIDINES

Ferenc M. Pallos, Walnut Creek, Calif.; Mervin E. Brokke, Stamford, Conn., and Duane R. Arneklev, Antelope, Mont., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 356,547, May 2, 1973, Pat. No. 3,989,503, which is a continuation-in-part of Ser. No. 297,561, Oct. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 208,041, Dec. 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 134,868, Apr. 16, 1971, abandoned. This application Aug. 2, 1976, Ser. No. 710,503
Int. Cl.[2] A01N 9/22
U.S. Cl. 71—88 109 Claims

1. An herbicidal composition comprising an active α-halo substituted acetanilide herbicide compound and an antidote therefor corresponding to the formula



in which X is oxygen or sulfur, R is haloalkyl having 1 to 10 carbon atoms, inclusive, and the term halo includes chloro and bromo substitutions, alkyl having 1 to 10 carbon atoms, inclusive, or alkylthio having 1 to 4 carbon atoms, inclusive; R_1, R_2, R_3, R_4, R_5 and R_6 are independently selected from the group consisting of hydrogen, lower alkyl having 1 to 4 carbon atoms, inclusive, alkoxyalkyl having a total of 2 to 4 carbon atoms, inclusive, and lower alkylol having 1 to 4 carbon atoms, inclusive; said antidote being antidotally active with said α-halo substituted acetanilide herbicide compound.

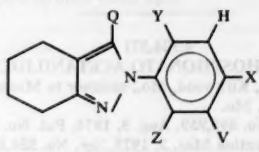
4,124,373

TETRAHYDROINDAZOLE HERBICIDES

Anthony D. Wolf, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 3, 1977, Ser. No. 756,439
The portion of the term of this patent subsequent to Nov. 22, 1994, has been disclaimed.
Int. Cl.[2] A01N 9/22; C07D 231/56
U.S. Cl. 71—92 **26 Claims**

1. A compound of the formula:



(I)

where

Q is chlorine, bromine or methyl;
X is hydrogen or methyl;
Y is hydrogen or methyl;
V is hydrogen or methyl; and
Z is hydrogen or methyl; with the proviso that at least one of X, Y, V or Z must be hydrogen.

6. A composition for the control of undesirable vegetation consisting essentially of a herbicidally effective amount of a compound of claim **1** and at least one of (a) a surface-active agent and (b) a solid or liquid diluent.

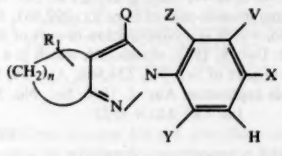
4,124,374

ALKYL-SUBSTITUTED CYCLOALKANAPYRAZOLE HERBICIDES

Anthony D. Wolf, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 655,842, Feb. 6, 1976, abandoned. This application Sep. 27, 1976, Ser. No. 727,362
Claims priority, application Taiwan, Apr. 13, 1976, 6510765
Int. Cl.[2] A01N 9/22; C07D 231/54, 231/56
U.S. Cl. 71—92 **40 Claims**

1. A compound of the formula



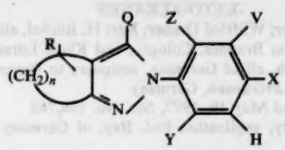
(I)

where

n is 3, 4 or 5;
R_1 is hydrogen or methyl;
Q is methyl;
X is fluorine, chlorine, bromine, iodine, cyano or methoxy;
Y is hydrogen, fluorine or chlorine;
Z is hydrogen or fluorine; and
V is hydrogen, fluorine or chlorine; with the proviso that
a. when *n* is 3, R_1 is hydrogen; and when V is fluorine or chlorine, X is fluorine, chlorine or bromine and Z is hydrogen;
b. when *n* is 4 and V is fluorine or chlorine, X is fluorine, chlorine or bromine and Z is hydrogen; and
c. when *n* is 5, R_1 is hydrogen, Y is hydrogen or fluorine, Z and V are hydrogen and X is fluorine, chlorine or bromine.

7. A composition for the control of undesirable vegetation consisting essentially of a herbicidally effective amount of a compound of claim **1** and at least one of (a) a surface-active agent and (b) a solid or liquid diluent.

29. A compound of the formula



(I)

where

n is 3 or 4;
R_1 is hydrogen or methyl;
Q is methyl;
X is chlorine;
Y is chlorine;
Z is hydrogen;
V is OR; and
R is alkyl of 1 to 4 carbon atoms, with the proviso that
a. when *n* is 3, R_1 is hydrogen.

31. A composition for the control of undesirable vegetation consisting essentially of a herbidically effective amount of a compound of claim **29** and at least one of (a) a surface-active agent and (b) a solid or liquid diluent.

4,124,375

SUBSTITUTED PHTHALIMIDES FOR REGULATING THE GROWTH OF PLANTS

Frederic G. Bollinger; John J. D'Amico, both of St. Louis, and Dale J. Hansen, St. Charles, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 12, 1977, Ser. No. 841,425
Int. Cl.[2] A01N 5/00
U.S. Cl. 71—96 **4 Claims**

1. A method for altering the development of the reproductive components of a corn plant which comprises applying to said corn plant an effective, non-lethal amount of a compound selected from the group consisting of:

N-(3-trifluoromethyl-4-nitrophenyl)phthalimide
N-(2-trifluoromethyl-5-bromophenyl)phthalimide
N-(3,5-dimethoxyphenyl)phthalimide
N-(3,4-dimethoxyphenyl)phthalimide
N-(4-pyridyl)phthalimide
N-(4,6-dimethyl-2-pyridyl)phthalimide
N-3,5-dichloro-2-pyridyl)phthalimide
N-(6-methoxy-3-pyridyl)phthalimide
N-(4-methylphenyl)phthalimide
N-(3-mercaptophenyl)phthalimide
N-(2-fluorophenyl)phthalimide
2-(p-phthalimidophenylthio)acetic acid
N-(3-trifluoromethyl-4-methoxyphenyl)phthalimide
N-(2-methyl-4-bromo-5-chlorophenyl)phthalimide
N-[m-(1-hydroxyethyl)phenyl]phthalimide
N-(3-trifluoromethyl-4-chlorophenyl)phthalimide
N-(2-chloro-5-trifluoromethylphenyl)phthalimide

N-(2-trifluoromethyl-4-chlorophenyl)phthalimide
N-(5-chloro-2-pyridyl)phthalimide
N-(3,5-dichlorophenyl)phthalimide
N-(4-chlorophenyl)phthalimide
N-(m-fluorobenzyl)phthalimide
N-(p-fluoroanilinomethyl)phthalimide
N-(phenylthiomethyl)phthalimide
m-phthalimidophenyl methylcarbamate
N-(2-nitro-4-trifluoromethylphenyl)phthalimide

4,124,376
HERBICIDE COMPOSITIONS

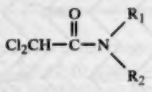
Ferenc M. Pallos, Walnut Creek; Mervin E. Brokke, Moraga, and Duane R. Arneklev, Sunnyvale, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 641,783, Dec. 17, 1975, Pat. No. 4,021,224, which is a division of Ser. No. 208,041, Dec. 9, 1971, which is a continuation-in-part of Ser. No. 134,868, Apr. 16, 1971, abandoned. This application Jan. 17, 1977, Ser. No. 759,687

Int. Cl.[2] A01N *9/20*

U.S. Cl. 71—118 **18 Claims**

1. A herbicidal composition comprising an active halo acetanilide herbicide compound and a non-phytotoxic antidotally effective amount of a compound having the formula



where each of R_1 and R_2 are alkenyl groups containing from 2 to 12 carbon atoms, inclusive; said compound being antidotally active with said halo acetanilide herbicide compound and wherein said compound is present in an amount ranging between about 0.0001 to 30 parts by weight for each part by weight of the active herbicidal compound.

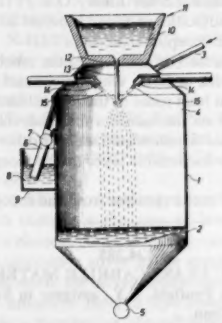
4,124,377
METHOD AND APPARATUS FOR PRODUCING ATOMIZED METAL POWDER

Ulf Rutger Larson, Ljungby, Sweden, assignor to Rutger Larson Konsult AB, Sweden

Filed Jul. 20, 1977, Ser. No. 817,154

Int. Cl.[2] B22D *23/08*

U.S. Cl. 75—0.5 C **6 Claims**



1. A method of producing metal powder, said method comprising the steps of providing a substantially closed granulation chamber, providing a reducing liquid in the lower part of said chamber and a reducing gaseous atmosphere above said reducing liquid, melting the metal of which the powder is to be formed, producing a casting stream of the molten metal in the reducing gaseous atmosphere of said substantially closed vessel, subjecting said stream to pressurised hydrocarbon atomizing agent to atomize the stream, cooling the metal particles at least partly in said reducing gaseous atmosphere and collecting the resulting powder in the reducing liquid.

4,124,378
METHOD OF SOLIDIFYING THE SLAG OBTAINED IN FERROCHROMIUM PRODUCTION

Wieslaw Kurdowski, Cracow; Henryk Makowski, Dabrowa Gornicza; Roman Sobczuk, Cracow; Zenobiusz Szczepanik; Albert Jochelson, both of Wroclaw; Leszek Chomicki, Gliwice; Aleksandra Thiel, Krakow-Nowa Huta; Aleksander Jochelson, Wroclaw, and Zygmunt Krupa, Siechnice, all of Poland, assignors to Huta Siechnice, Siechnica k, Wrockawia, Poland

Filed Oct. 6, 1976, Ser. No. 730,252

Int. Cl.[2] C22B *4/00;* **C22C** *33/00;* **C21C** *5/52*

U.S. Cl. 75—10 R **8 Claims**

1. In the process for producing ferrochromium by melting a charge comprising chromium ore, lime and ferrosilicon in a furnace thereby forming slag and ferrochromium, draining off the slag and the ferrochromium and allowing the slag to solidify, the improvement consisting of adding boron oxide to the charge whereby the slag when solidified is bound into a mass which does not disintegrate into dust.

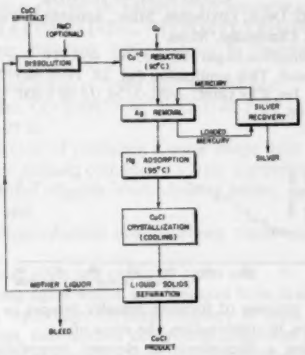
4,124,379
RECOVERY OF SILVER FROM CUPROUS CHLORIDE SOLUTIONS BY AMALGAMATION

Mark A. Peters, and William G. Kazel, both of Arvada, Colo., assignors to Cyprus Metallurgical Processes Corporation, Los Angeles, Calif.

Filed Jan. 17, 1977, Ser. No. 760,082

Int. Cl.[2] C22B *11/00*

U.S. Cl. 75—118 R **21 Claims**



1. A process for recovering silver from a cuprous chloride solution which comprises:

(a) contacting the solution with a mercury amalgam of a metal selected from the group consisting of metals of groups 4*a*, 5*a*, 2*b*, and 8 of the periodic table and copper to replace said metal in the amalgam with silver, and

(b) recovering the silver by separating it from the formed silver amalgam.

4,124,380
SILVER-COPPER-GERMANIUM ALLOYS HAVING HIGH OXIDATION RESISTANT MELTS

William V. Youdelis, 1935 W. Grand Blvd., Windsor, Ontario, Canada (N9E 1G6)

Filed Jun. 24, 1977, Ser. No. 809,764

Int. Cl.[2] C22C *5/00*

U.S. Cl. 75—173 C **8 Claims**

1. A base alloy of silver-copper-germanium consisting essen-

tially of 40 to 85% by weight silver, 15 to 60% by weight copper and 0.1 to 10% by weight germanium.

4,124,381

NON-PRECIOUS DENTAL CASTING ALLOY

Steven D. Sklar, 16 Cypress Ct., Brooklyn, N.Y. 11208

Filed Aug. 30, 1976, Ser. No. 718,763
Int. Cl.[2] C22C *19/05*
U.S. Cl. 75—171 **1 Claim**

1. A non-precious dental casting alloy consisting essentially of about 67–73% nickel, about 18–24% chromium about 1.85–2.5% silicon, about 2.5–3.5% aluminum, about 0.4–2% titanium, about 2.5–5.5% iron, and about 0.002–1.5% zirconium, wherein the ratio of silicon-chromium is about 1:10.

4,124,382

DENTAL ALLOY FOR USE IN THE ADHESION OF PORCELAIN

Emil M. Prosen, Bala-Cynwyd, Pa., assignor to Neoloy Products, Inc., Posen, Ill.

Filed Aug. 5, 1977, Ser. No. 822,146
Int. Cl.[2] C22C *5/02*
U.S. Cl. 75—172 R **6 Claims**

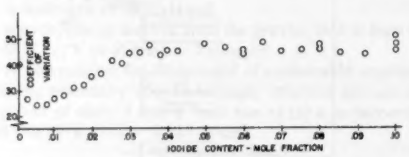
1. A precious dental metal alloy particularly adapted to have porcelain and like ceramics fused thereto consisting essentially of palladium, an effective amount up to 25% tin, a small percentage of each of the following elements up to 2% iron, up to 1% aluminum, and up to 1¼% boron and the balance palladium.

4,124,383

DIFFUSION TRANSFER COLOR PRODUCTS AND PROCESSES EMPLOYING SILVER HALIDE GRAINS COMPRISING IODIDE

Edward G. Denk, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 460,719, Apr. 15, 1974, abandoned. This application Jul. 13, 1976, Ser. No. 704,952
Int. Cl.[2] G03C *7/00, 5/54, 1/76;* **C03C** *1/40*
U.S. Cl. 96—3 **36 Claims**



30. A process of forming transfer images in color which comprises, in combination, the steps of:

exposing a photosensitive element comprising a support carrying a photosensitive silver halide layer comprising silver halide grains with an iodide content of about 0.625 mole percent, said grains being non-regular in habit and having a mean volume diameter of about 0.9 to 1.2 μ, said grains exhibiting a coefficient of variation of less than about 30 percent, said layer having associated therewith a dye developer;

developing said exposed silver halide layer with an aqueous alkaline processing composition; forming thereby an imagewise distribution of diffusible dye developer as a function of said development; and

transferring by diffusion at least a portion of said imagewise distribution of said diffusible dye developer to said image-receiving layer in superposed relationship with said developed silver halide layer to impart thereto a dye transfer image.

32. A process as defined in claim **30** wherein said photosensitive element comprises a support carrying:

a red-sensitive silver halide emulsion layer having associated therewith a cyan dye developer;

a green-sensitive silver halide emulsion layer having associated therewith a magenta dye developer; and

a blue-sensitive silver halide emulsion layer having associated therewith a yellow dye developer;

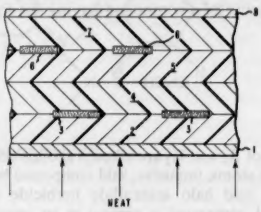
the silver halide grains of at least one of said red-sensitive, green-sensitive and blue-sensitive silver halide layers having an iodide content of about 0.625 mole percent, the grains of said silver halide emulsion being non-regular in habit and having a mean volume diameter of about 0.9 to 1.2 μ, said grains exhibiting a coefficient of variation of less than about 30 percent.

4,124,384

IMAGE REPRODUCTION PROCESS USING SUBLIMABLE COLORANTS AND PHOTOHARDENABLE LAYERS

John M. Centa, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 7, 1977, Ser. No. 766,374
Int. Cl.[2] G03C *7/16, 7/00, 5/04;* **D06P** *00/00*
U.S. Cl. 96—14 **16 Claims**



5. A process for forming a multiple color image on a receptor material using a multiple colored, photohardenable element, said process comprising the steps of:

(a) applying a photohardenable layer on a carrier material;

(b) exposing imagewise to actinic radiation the photohardenable layer to form imagewise tacky and non-tacky areas;

(c) toning the tacky areas of the layer by applying and adhering thereto a toner material comprising a heat transferable, sublimable dye or mixture of dyes;

(d) repeating steps (a) to (c) one or more times, each time applying a photohardenable layer on the preceding layer and using a different color toner;

(e) placing the multicolored toned element in contact with the surface of a receptor material;

(f) heating for at least 5 seconds either the toned element, the receptor material, or both, while in contact to a temperature at which at least some of the dye sublimes and imagewise condenses on the receptor material, the temperature being below that which would melt or otherwise degrade either the photohardenable layer or the receptor material; and

(g) removing the toned element from the receptor material.

4,124,385

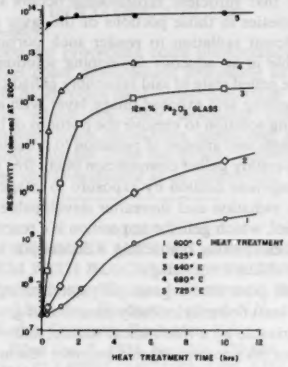
MAGNETIC GLASS CARRIER MATERIALS

Michael P. O'Horo, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 2, 1976, Ser. No. 747,118
Int. Cl.[2] G03G *13/09, 9/14*
U.S. Cl. 96—1 SD **26 Claims**

20. An electrostatographic imaging process comprising the steps of providing an electrostatographic imaging member having a recording surface, forming an electrostatic latent image on said recording surface, and contacting said electrostatic latent image with a developer mixture comprising finely-divided toner particles electrostatically clinging to the surface of low density, magnetic carrier particles, said carrier particles

comprising alumino-boro-silicate glass containing about 40 molar percent SiO_2, about 30 molar percent B_2O_3, about 20 molar percent Cao, and about 10 molar percent Al_2O_3, said alumino-boro-silicate glass also containing from between about 10 to about 15 molar percent Fe_2O_3 in which superparamagnetic Fe_3O_4 ferrite crystallites having an average particle size of up to about 500 Å have been precipitated by heat treatment



of said glass at temperatures in the range of between about 600° C. and about 800° C. for up to about 24 hours, wherein said carrier particles have a resistivity on the order of about 10^6 to about 10^{12} ohm/cm and display soft magnetic properties with a lack of hysteresis behavior, whereby at least a portion of said finely-divided toner particles are attracted to and deposited on said recording surface in conformance with said electrostatic latent image.

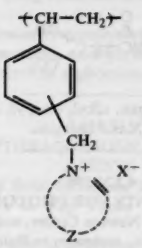
4,124,386

COLOR DIFFUSION TRANSFER RECEIVING LAYER COMPRISING POLYMERIC QUATERNARY N-HETEROCYCLIC MORDANT

Takashi Yoshida, and Takushi Miyazako, both of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

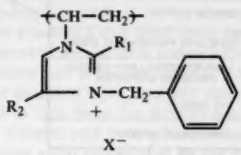
Filed Oct. 24, 1974, Ser. No. 517,561
Claims priority, application Japan, Oct. 24, 1973, 48-119610
Int. Cl.[2] G03C *7/00, 5/54, 1/40*
U.S. Cl. 96—29 D **30 Claims**

1. In a color diffusion transfer process for forming transfer images which comprises the step of imagewise exposing a photosensitive element comprising a support having thereon at least one photosensitive silver halide emulsion layer and having associated with the silver halide in said photosensitive silver halide emulsion layer a dye image-forming material which provides a distribution of a diffusible dye corresponding to said imagewise exposure as the result of development of said photosensitive silver halide emulsion, processing said exposed photosensitive element with an aqueous alkaline solution, thereby forming an imagewise distribution of said diffusible dye and transferring at least partially to a superposed image-receiving layer to provide thereto a dye image, the improvement which comprises said image-receiving layer comprising a polymer mordant having therein at least one of the structural units represented by the general formula (I)


(I)

delocalized

wherein Z represents the atomic group necessary for completing a nitrogen-containing unsaturated electron delocalized heterocyclic ring, and X^- represents a monovalent anion; or represented by the general formula (II)


(II)

wherein R_1 and R_2 each represents a hydrogen atom, an alkyl group, a hydroxy alkyl group, or an aralkyl group, and X^- represents a monovalent anion.

4,124,387

POSITIVE IMAGES IN PHOTOTHERMOGRAPHIC MATERIALS CONTAINING NITROXYL COMPOUNDS

Carl F. Kohrt, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 11, 1977, Ser. No. 814,565
Int. Cl.[2] G03C *5/54, 7/00, 1/40, 1/02*
U.S. Cl. 96—29 D **26 Claims**

26. In a method of providing a color image from a photothermographic element comprising a layer comprising

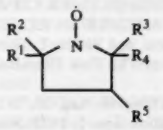
(a) photosensitive negative-working silver halide;

(b) a binder; and

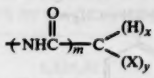
(c) an oxidation-reduction image-forming combination comprising

(i) an organic silver salt oxidizing agent and

(ii) a reducing agent which, in its oxidized form, is capable of reacting with color-forming couplers to form dyes or leuco dyes, said method comprising imagewise exposing the element to provide a latent image and development at a temperature greater than 100° C. for from about 5 to about 30 seconds, and transfer of the image dyes with an organic solvent to a receiver sheet, the improvement comprising the presence within the same layer of the element of at least one free radical nitroxyl compound having the formula:



wherein R^1, R^2, R^3 and R^4 are independently selected alkyls having 1 to 6 carbon atoms; and R^5 is an electron withdrawing group selected from the group consisting of —$COOR^6$ and



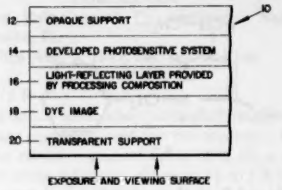
wherein R^6 is hydrogen, alkyl, or aryl, m is 1 or 2, x is 0 to 2, y is 1 to 3, and X is a halogen.

4,124,388

AMMONIUM MORDANTS FOR PHOTOGRAPHIC DYES

Irena Y. Bronstein-Bonte, Newton Center, and Lloyd D. Taylor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 2, 1977, Ser. No. 793,061
Int. Cl.[2] G03C *1/40, 7/00, 5/54*
U.S. Cl. 96—29 D **48 Claims**

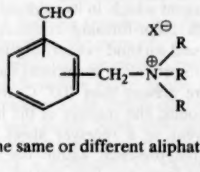


46. A method for forming a diffusion transfer image which comprises the steps of:

a. photoexposing a photosensitive element of a diffusion transfer film unit, said photosensitive element comprising a silver halide emulsion layer carried by a support and integrated with a diffusion transfer dye image-providing material;

b. developing the photoexposed element by contacting the element with a diffusion transfer processing composition to form an imagewise distribution of diffusible dye image-providing material as a function of development;

c. transferring said imagewise distribution of dye image-providing material to an image-receiving layer carried by a support and in superposed relationship with said photosensitive element where said imagewise distribution is mordanted by a dye image material mordant(s) to provide said diffusion transfer image, said mordant(s) comprising an acetal of a polyvinyl alcohol and a formyl benzyl quaternary ammonium salt of the formula:



where each R is the same or different aliphatic substituent and X is an anion.

4,124,389

GELLED PHOTOPOLYMER COMPOSITION FOR ARTICLE IN RELIEF

Clayton W. Hoornstra, and Violete L. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 606,260, Aug. 20, 1975, Pat. No. 4,072,529. This application Apr. 7, 1977, Ser. No. 785,395
Int. Cl.[2] G03C *5/00, 1/94, 1/78*
U.S. Cl. 96—35.1 **56 Claims**

1. In a process for preparing an article in relief, wherein a blank comprising an image layer containing a photocurable component is exposed to imagewise modulated actinic radiation so that portions of the image layer contacted by the radiation are cured, and wherein the unexposed portions of the image layer are thereafter selectively removed to provide an article having a surface in relief, the improvement which comprises: (a) employing as the photocurable component in said layer a reversibly gelled composition as hereafter described; (b) exposing said image layer to imagewise modulated actinic radiation so that sufficient crosslinking occurs through the ethylenic moieties in those portions of the layer actually receiving sufficient radiation to render such portions substantially insoluble in an aqueous developing solution capable of reversing the gelled state of said reversibly gelled composition; and (c) contacting said exposed image layer with a gel-reversing developing solution to remove the portions of the layer not receiving a sufficient amount of radiation to crosslink same, the aforesaid reversibly gelled composition being free radicalcurable in an imagewise fashion by exposure to imagewise modulated actinic radiation and thereafter developable to form an article in relief, which gelled composition is a reaction product of a process comprising contacting a dialdehyde with a polymeric composition comprising:

Component (a) a first organic polymer bearing, per molecule, at least one ethylenically unsaturated group which is polymerizable by a free radical source; and

Component (b) a second organic polymer bearing, per molecule, at least two Z groups, wherein each Z is independently primary hydroxyl or mercapto; with the proviso that when Component (a) bears at least two Z groups per molecule, Component (b) may be omitted.

4,124,390

DYE TONING SYSTEM

Victor E. Kohn, Westbury, N.Y., assignor to Recognition Systems, Inc., Port Washington, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,768
Int. Cl.[2] G03C *7/00, 5/32*
U.S. Cl. 96—57 **26 Claims**

1. A method of dye toning a metallic silver image on a photographic substrate which comprises

contacting the image bearing surface of said substrate with an aqueous solution having a pH in the range 7.5 to 11.5 for a predetermined time period,

removing said aqueous solution from said substrate,

admixing an aqueous mordant solution having a pH in the range 7.5 to 11.5 and containing potassium ferricyanide and iodine with an aqueous colorant solution containing an effective amount for coloring an image area of said substrate of a preformed water dispersible dye selected from the group consisting of diphenylmethane, triphenylmethane, acridine, oxazine, thiazine, diazo, azine and rhodamine dyes which can be mordanted to a complex formed from said potassium ferricyanide, metallic silver and said iodine under aqueous alkaline conditions to yield a color processing solution having a pH in the range 7.5–11.5,

applying said processing solution to a preselected portion of said substrate containing said metallic silver image and a background area for a predetermined time period,

removing said color processing solution from said substrate,

contacting the portion of said substrate treated with said color processing solution with an aqueous fixer solution having a pH of at least 7.5 and containing from about 10 to about 50% by weight of an organic solvent which is at least partially water soluble and at least 0.5% by weight of an alkali metal iodide, removing said fixer solution from said substrate, and

drying said image bearing substrate.

4,124,391

PROCESS FOR PROCESSING COLOR PHOTOGRAPHIC MATERIAL

Junkiti Ogawa, and Isao Shimamura, both of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Feb. 15, 1977, Ser. No. 768,817
Claims priority, application Japan, Feb. 24, 1976, 51-19216
Int. Cl.[2] G03C 5/30, 7/00
U.S. Cl. 96—66.5 7 Claims

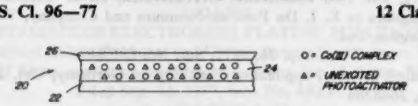
1. A process for processing color photographic materials, which involves color development processing an image-wise exposed silver halide color light-sensitive material with a color developer, in which the color developer contains a p-phenylenediamine color developing agent and at least one monosaccharide selected from the group consisting of D-xylose, D-ribose and D-arabinose as an antioxidant.

4,124,392

COBALT COMPLEX AMPLIFICATION IMAGING SYSTEM WITH BLOCKED DYE PRECURSOR

Anthony Adin, Rochester; Thomas J. Huttemann, Rushville, and Robert D. Lindholm, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 7, 1976, Ser. No. 720,874
Int. Cl.[2] G03C 1/40, 1/52, 1/00, 5/24
U.S. Cl. 96—77 12 Claims

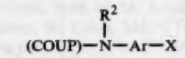


1. An imaging element comprising at least one image-providing layer, said layer including

(a) an inert cobalt (III) complex containing amine ligands, said complex being reducible to a form which releases the ligands, and

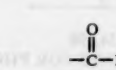
(b) a blocked dye precursor which is amine activatable to form an unblocked dye precursor capable of an oxidation-reduction reaction with said complex to form a dye,

said dye precursor being a blocked leuco dye having the formula



wherein COUP is a photographic color-forming coupler connected to the nitrogen atom through a carbon atom at the coupling position; Ar is a substituted or unsubstituted paraphenylene group containing from 6 to about 20 carbon atoms, the substituents of which are halogen atoms in the ortho or meta position of the ring; and X is either an amino group, a hydroxyl group, or the group:

wherein R^1 is a hydrolyzable carbonyl-containing group of the formula



wherein R^4 is a group containing 1 to 12 carbon atoms and is an alkyl group or an aryl group; and R^2 is a hydrogen atom or the same substituent as R^1, provided that at least one of X and R^2 is a carbonyl-containing group.

3. An element as defined in claim 1 and further including a radiation-sensitive layer adjacent to said image-providing layer, said radiation-sensitive layer including

(a) an inert cobalt (III) complex containing amine ligands, and complex being reducible to a form which releases the ligands, and

(b) a photoactivator responsive to radiation within at least the visible spectrum, said photoactivator being either a spectral sensitizer or a photo-reductant.

4,124,393

SHIFTED ANTHRAQUINONE DYE DEVELOPING AGENTS

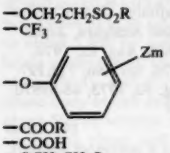
Shinichi Imai, and Seiki Sakanoue, both of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Filed Oct. 8, 1975, Ser. No. 620,678
Claims priority, application Japan, Oct. 8, 1974, 49-115778
Int. Cl.[2] G03C 1/10, 1/40, 7/00, 5/54
U.S. Cl. 96—77 31 Claims

24. In photosensitive materials for color diffusion transfer processing comprising at least one photosensitive element comprising a support, a silver halide emulsion layer and an adjacent hydrophilic colloid layer wherein the hydrophilic colloid layer contains a dye developing agent having absorption in the spectral sensitization wavelength range of the silver halide emulsion and is on the support side of said adjacent silver halide emulsion layer, and said photosensitive materials are exposed to light from the support side upon use, the improvement wherein said hydrophilic colloid layer contains a dye developing agent represented by the formula (I)

 (I)

wherein A represents an anthraquinone dye moiety substituted in one or more of the 1, 4, 5 or 8 positions with the amino group shown in the formula, X represents a hydrogen atom, an aliphatic hydrocarbon group, an alicyclic hydrocarbon group, an aryl group or a heterocyclic group, at least one of A and X contains an o-dihydroxyphenyl group or a p-dihydroxyphenyl group as a dye developing agent moiety, n is an integer of 1 to 4, and COY represents a group which is released from the nitrogen atom at a pH of above 9, wherein Y is a group represented by the formulae (II), (III), (IV), (V), (VI) or (VII):



wherein R represents an aliphatic hydrocarbon group, an alicyclic hydrocarbon group or an aryl group; Z represents a hydrogen atom, a halogen atom, a lower alkyl group, a nitro group or a cyano group; Q represents a halogen atom; and m is an integer of 1 to 3.

4,124,394

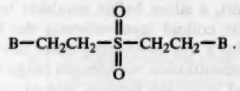
COLOR DIFFUSION TRANSFER PHOTOGRAPHIC MATERIALS WITH SULFONE COLOR DEVELOPING AGENT SCAVENGERS

Hidefumi Sera; Motohiko Tsubota, and Sosuke Hanai, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashirara, Japan

Filed Dec. 27, 1976, Ser. No. 754,802
Claims priority, application Japan, Dec. 29, 1975, 50/159256
Int. Cl.[2] G03C 7/00, 5/54, 1/40
U.S. Cl. 96—77 15 Claims

1. A color diffusion transfer photographic material comprising a photosensitive element containing at least one silver halide emulsion layer having associated therewith a non-diffus-

ible dye image-providing material; an image-receiving element for immobilizing therein a diffusible dye formed by the oxidation reaction of the dye image-providing material and a primary aromatic amino color developing agent to form dye images; a processing composition for developing silver halide in the silver halide emulsion layer once the silver halide is exposed and transferring by diffusion the diffusible dye to the image-receiving element and with at least one of the photosensitive element, the image-receiving element and the processing composition containing a primary aromatic amino color developing agent or a precursor thereof; with at least one of said photosensitive element and said image-receiving element of the photographic material having incorporated therein a material which both prevents color image fading and reduces the formation of stain in blank areas which is at least one of (1) divinyl sulfone and (2) a divinyl sulfone derivative represented by the general formula:



wherein B represents an ammonium group represented by the formula:

wherein R_1, R_2 and R_3, which may be the same or different, each represents a saturated or unsaturated, straight chain or branched chain aliphatic group having 1 to 7 carbon atoms; and R_1, R_2 and R_3 may combine with each other to form a 5-membered ring or a 6-membered ring; X^- represents an acid anion; and n is 0, 1 or 2.

4,124,395

SUBBING LAYER ON POLYESTER FILM FOR LIGHT-SENSITIVE MATERIAL

Takeji Ochiai, and Sho Nakao, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara, Japan

Continuation-in-part of Ser. No. 496,686, Aug. 12, 1974, abandoned. This application Aug. 3, 1976, Ser. No. 711,197
Claims priority, application Japan, Aug. 10, 1973, 48-89870
Int. Cl.[2] G03C *1/94*
U.S. Cl. 96—87 R **14 Claims**

1. A light-sensitive element comprising a polyester support, a surface of which has been subjected to a treatment to render the surface hydrophilic; a subbing layer on the treated surface comprising a polymer having carboxyl groups or groups which form carboxyl groups upon hydrolysis, said polymer having a molecular weight of about 5,000 to 500,000 and as an addition polymerizable monomer, hexahydro-1,3,5-triacryl-s-triazine, said addition polymerizable monomer being present in an amount of about 2.5 to 100% by weight based on said polymer having carboxyl groups or groups which form carboxyl groups upon hydrolysis; and a silver halide emulsion layer on said subbing layer.

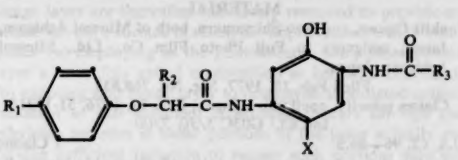
4,124,396

2,5-DICARBONYLAMINOPHENOL DYE-FORMING COUPLERS

Harland J. Osborn, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 3, 1977, Ser. No. 774,087
Int. Cl.[2] G03C *7/00, 1/40*
U.S. Cl. 96—100 R **10 Claims**

1. A photographic element comprising a support bearing at least one layer of a photosensitive silver halide emulsion and a cyan dye-forming coupler having the structure



wherein

R_1 is R_4SO_2NH— or R_4NHSO_2—;

R_2 is hydrogen or alkyl of 1 to 20 carbon atoms;

R_3 is phenyl, substituted phenyl, alkyl of 1 to 20 carbon atoms or substituted alkyl of 1 to 20 carbon atoms;

R_4 is alkyl of 1 to 20 carbon atoms such that together R_2 and R_4 contain a total of 8 to 32 carbon atoms; and

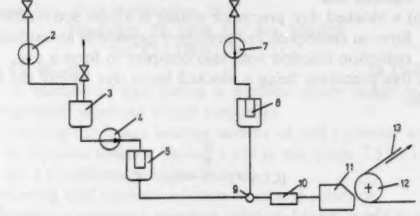
X is a coupling-off group.

4,124,397

PROCESS FOR HARDENING PHOTOGRAPHIC SILVER HALIDE EMULSIONS

Werner Abele; Wolfgang Pistor, both of Neu-Isenburg; Manfred Schmidt, Dietzenbach-Steinberg; Harry O. Smith, Neu-Isenburg, and Nils Spannhake, Grevenbroich, all of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 26, 1977, Ser. No. 836,840
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1976, 2648286
Int. Cl.[2] G03C *1/34, 1/30*
U.S. Cl. 96—109 **6 Claims**



1. A process for the hardening of a photographic gelatino-silver halide emulsion using glutaraldehyde or a substituted glutaraldehyde as the hardener, characterized in that (1) the hardener is continuously added to, and mixed with, a stream of the emulsion at a point between the supply vessel in which the emulsion stream originates, and a coater, and immediately before coating, and (2) the hardener is added in a concentration of less than 0.5% by weight, based on the weight of total gelatin in the emulsion stream.

4,124,398

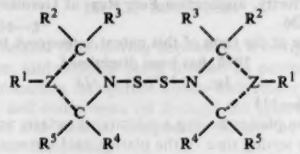
THIYL BLEACHING AGENTS FOR PHOTOGRAPHIC PROCESSES

Samuel J. Ciurca, Jr., Rochester, and Carl F. Kohrt, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 11, 1977, Ser. No. 814,561
Int. Cl.[2] G03C *1/02*
U.S. Cl. 96—114.1 **20 Claims**

1. A photothermographic element comprising a support having thereon a layer comprising:

a. a reducing agent which provides a developed image within about 90 seconds at a temperature of about 100° to 250° C. upon heating said element;
b. an organic silver salt oxidizing agent;
c. a silver halide; and
d. a thiyl bleaching agent precursor having the formula



wherein Z comprises the nonmetallic atoms necessary to complete a 5 to 7 member heterocyclic ring; R^2, R^3, R^4 and R^5 are independently selected from the group consisting of alkyl, cycloalkyl, aralkyl, aryl or R^2 and R^3 or R^4 and R^5 can be taken together with the carbon atom of the ring to which they are attached to form a cycloalkyl or cycloalkenyl having from 4 to 10 carbon atoms; and R^1 is independently selected from the group consisting of hydrogen and oxo.

4,124,399

STABILIZED ELECTROLESS PLATING SOLUTIONS

Michael Gulla, Sherborn, and Christy Savas, Framingham, both of Mass., assignors to Shipley Company Inc., Newton, Mass.

Filed Sep. 13, 1977, Ser. No. 832,937
Int. Cl.² C23C *3/02*
U.S. Cl. 106—1.23 **10 Claims**

1. In an aqueous electroless copper plating solution including a source of cupric ions, a complexing agent sufficient to render said cupric ions soluble in solution, a pH adjustor and a reducing agent for said cupric ions; the improvement comprising gallium in said solution in an amount capable of providing increased bath stability.

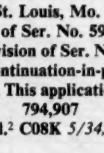
4,124,400

FLAME RETARDANT POLYMER COMPOSITIONS

Albert W. Morgan, Collinsville, Ill.; Ignatius Schumacher, and William Vanderlinde, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 599,568, Jul. 28, 1975, abandoned, which is a division of Ser. No. 459,257, Apr. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 276,810, Jul. 31, 1972, abandoned. This application May 9, 1977, Ser. No. 794,907
Int. Cl.² C08K *5/34, 5/35*
U.S. Cl. 106—15 FP **36 Claims**

1. A composition comprising a natural polymer and an effective flame retarding amount of a compound of the formula



wherein:
Z represents a radical selected from the group consisting of alkyl and aryl radicals; and

is a heterocyclic ring selected from the group consisting of pyrroles, oxazoles, pyrazoles, oxazines, diazines and piperidine.

4,124,401

POLYCRYSTALLINE DIAMOND BODY

Minyoung Lee, Schenectady; Lawrence E. Szala, Scotia, and Robert C. DeVries, Burnt Hills, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 21, 1977, Ser. No. 844,448
Int. Cl.² C04B *35/56, 35/58, 31/16*
U.S. Cl. 106—44 **10 Claims**

1. A polycrystalline diamond body comprised of a mass of diamond crystals adherently bonded together by a silicon atom-containing bonding medium comprised of silicon carbide and a carbide and/or silicide of a metal component which forms a silicide with silicon, said diamond crystals ranging in size from about 1 micron to about 1000 microns, the density of said diamond crystals ranging from at least about 70% by volume up to about but less than 90% by volume of said body, said silicon atom-containing bonding medium being present in an amount ranging up to about 30% by volume of said body, said bonding medium being distributed at least substantially uniformly throughout said body, the portion of said bonding medium in contact with the surfaces of said diamond crystals being at least in a major amount silicon carbide, said diamond body being at least substantially pore-free.

4,124,402

HOT PRESSING OF SILICON NITRIDE USING MAGNESIUM SILICIDE

Charles D. Greskovich, Schenectady, and Chester R. O'Clair, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 756,083, Jan. 3, 1977. This application Nov. 7, 1977, Ser. No. 849,188
Int. Cl.² C04B *35/58, 35/56*
U.S. Cl. 106—73.5 **4 Claims**

1. A hot-pressed polycrystalline silicon nitride body having a density ranging from about 80% to about 100% of the theoretical density of silicon nitride, said body consisting essentially of silicon nitride, magnesium and oxygen, said silicon nitride ranging from the α-form to the β-form with all mixtures of said α-and β-forms falling within said range, said magnesium being present in an amount ranging from about 0.3% by weight to about 1.9% by weight of said silicon nitride, said oxygen being present in an amount ranging up to about 3% by weight of said body, said polycrystalline body ranging from a single phase body to one comprised of a primary phase and less than about 5% by volume of said body of a secondary magnesium-containing phase, said body being at least substantially free of an intergranular silicate glassy phase at its grain boundaries and retaining at least about 75% of its room temperature mechanical properties at elevated temperatures ranging up to about 1350° C. in air.

4,124,403

HOT PRESSING OF SILICON NITRIDE USING BERYLLIUM ADDITIVE

Charles D. Greskovich, Schenectady; Svante Prochazka, Ballston Lake, and Chester R. O'Clair, Latham, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 756,084, Jan. 3, 1977. This application Nov. 7, 1977, Ser. No. 849,187
Int. Cl.² C04B *35/58*
U.S. Cl. 106—73.5 **5 Claims**

1. a hot pressed polycrystalline silicon nitride body having a density ranging from about 80% to about 100% of the theoretical density of silicon nitride, said body consisting essentially of silicon nitride, beryllium and oxygen, said silicon nitride ranging from the α-form to the β-form with all mixtures of said α-and β-forms falling within said range, said beryllium being present in an amount ranging from about 0.1% by weight to

about 2.0% by weight of said silicon nitride, said oxygen being present in an amount ranging up to about 3% by weight of said body, said polycrystalline body ranging from a single phase body to one comprised of a primary phase and up to about 6% by volume of said body of a secondary solid beryllium silicon nitride phase, said body being at least substantially free of an intergranular silicate glassy phase at its grain boundaries and substantially retaining its room temperature mechanical properties at elevated temperatures ranging up to about 1400° C. in air.

4,124,404

STEEL SLAG CEMENT AND METHOD FOR MANUFACTURING SAME

Gyoichi Suzuki, Tokyo; Ryo Ando, Yokohama; Tatsuo Koyama, Yokohama; Shoji Kubodera, Yokohama, and Renichi Kondo, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1977, Ser. No. 804,328

Claims priority, application Japan, Jun. 23, 1976, 51/73108

Int. Cl.[2] C04B *7/14*

U.S. Cl. 106—103 **20 Claims**

1. A steel slag cement manufactured from a steel slag, which consists of, in percentage:

CaO: 68 to 72%,
SiO_2: 22 to 26%,
Al_2O_3: 1 to 3%,
Fe_2O_3: 0.2 to 1.0%,
P_2O_5: 0.1 to 0.6%,
TiO_2: 0.4 to 0.9%,
MnO: trace to 0.4%,
MgO: 0.3 to 3.0%,
CaF_2: 0.3 to 2.0%
and the balance incidental impurities,

wherein in the ternary constitutional diagram of FIG. 1 of $CaO—SiO_2—Al_2O_3$, the area representing the range of the CaO, SiO_2 and Al_2O_3 contents is situated on the side of higher SiO_2 content relative to the line connecting $3CaO.SiO_2$ and $3CaO.Al_2O_3$, said area not being traversed by the line connecting $3CaO.SiO_2$ and $12CaO.7Al_2O_3$.

4,124,405

PROCESS FOR SOLIDIFYING AQUEOUS WASTES AND PRODUCTS THEREOF

Jean Quiénot, Palaiseau, France, assignor to PEC-Engineering Societe Anonyme, Paris, France

Filed Aug. 2, 1976, Ser. No. 710,666

Claims priority, application France, Aug. 6, 1975, 75 24469

Int. Cl.[2] C04B *11/14*

U.S. Cl. 106—111 **13 Claims**

1. In a process for the treatment of solidifiable aqueous wastes containing water-soluble environmental pollutants with a sufficient quantity of setting agent which converts the pollutants into a water-insoluble mass, the improvement which comprises treating the aqueous waste in a homogeneous condition, employing as the setting agent a particulate water-insoluble slag from metal refining, in the presence of a slag hydration-promoting combination of, sulfate and alkali metal ions and wherein 100 parts of starting waste are mixed with 5 to 35 parts of said slag, 0.02 to 15 parts of alkaline agent, 0.2 to 30 parts of said hydration-promoting combination, 0 to 2 parts of emulsifying agent and 0 to 150 parts of pozzolana, fly ash or clinker, there being sufficient alkalinity in the additives to yield a pH above 8.5 in the resultant mixture.

4,124,406

SETTING RETARDER

Helmut Knorre, Seligenstadt; Manfred Langer, Hanau, and Wolfgang Fischer, Kahl, all of Germany, assignors to Deutsche Gold und-Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Sep. 14, 1976, Ser. No. 723,174

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1975, 2542536

The portion of the term of this patent subsequent to Jun. 13, 1995, has been disclaimed.

Int. Cl.[2] C04B *11/14*

U.S. Cl. 106—111 **8 Claims**

1. Gypsum plaster having a mixture of tartaric acids therein to delay the setting time of the plaster, said tartaric acids consisting of a mixture of meso-tartaric acid with (1) L-tartaric acid, (2) d,L-tartaric acid or (3) both of L-tartaric acid and d,L-tartaric acid, said mixture of tartaric acids containing 5 to 80% of meso-tartaric acid by weight, said plaster containing 0.01 to 0.5% by weight of said mixture of tartaric acids, and when said mixture of tartaric acids is (2) or (3) the plaster has sufficient calcium hydroxide that a 5% aqueous paste of the plaster has a pH of at least 11.5.

4,124,407

METHOD FOR CLEANING ALUMINUM AT LOW TEMPERATURES

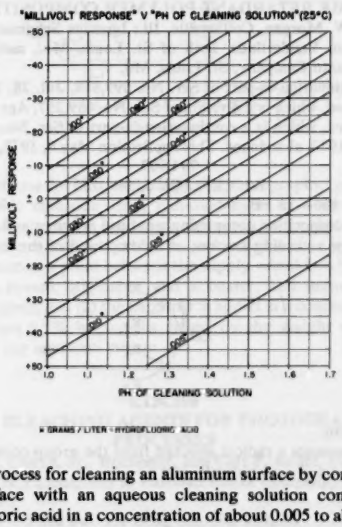
Robert E. Binns, Roslyn, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Continuation-in-part of Ser. No. 607,154, Aug. 25, 1975, Pat. No. 4,009,115, which is a continuation-in-part of Ser. No. 442,726, Feb. 14, 1974, abandoned, which is a division of Ser. No. 755,928, Dec. 30, 1976. This application Dec. 30, 1976, Ser. No. 755,929

The portion of the term of this patent subsequent to Feb. 22, 1994, has been disclaimed.

Int. Cl.[2] B08B *3/08*

U.S. Cl. 134—3 **13 Claims**


"MILLIVOLT RESPONSE" V "PH OF CLEANING SOLUTION"(25°C)
MILLIVOLT RESPONSE
PH OF CLEANING SOLUTION
GRAMS / LITER HYDROFLUORIC ACID

1. A process for cleaning an aluminum surface by contacting said surface with an aqueous cleaning solution comprising hydrofluoric acid in a concentration of about 0.005 to about 0.1 gram per liter of said aqueous cleaning solution and sulfuric acid in a concentration of about 1.0 to about 10 g/l of said aqueous cleaning solution and having a surfactant dissolved therein.

4,124,408

METHOD OF REMOVING DEPOSITS ON REFRIGERATION SYSTEM SURFACES

Harold G. Eaton, Lanham, Md., and David L. Venezky, Fairfax, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 2, 1977, Ser. No. 802,707
Int. Cl.[2] B08B *3/08*
U.S. Cl. 134—3 7 Claims

1. In a method of removing deposits on a refrigeration system surface, said deposits being formed by passing a halogenated hydrocarbon refrigerant mixed with minor amounts of water, air, and compressor oil through the system in contact with metals and metallic compounds within the system, the improvement comprising

a. contacting at a temperature from about 30° to about 100° C. said surface with an aqueous solution saturated with ethylenediaminetetraacetic acid and with a pH from about 2 to about 4; and

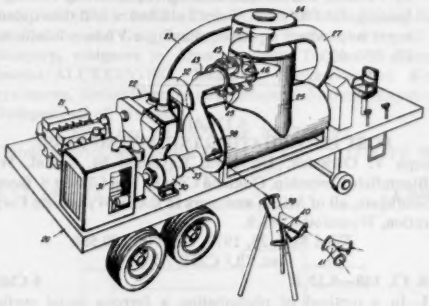
b. removing said saturated solution from said surface.

4,124,409

PNEUMATIC BULK MATERIAL REMOVAL APPARATUS AND METHOD

James B. Gladden, 7260 Duncourtney Dr., Atlanta, Ga. 30328

Filed Nov. 5, 1976, Ser. No. 732,004
Int. Cl.[2] B08B *5/04*; A47L *5/38*
U.S. Cl. 134—21 11 Claims



1. A method of continuously removing bulk industrial wastes from locations of waste accumulation and continuously disposing of the waste comprising the steps of continuously applying suction to a solid waste inlet conduit, delivering the waste from said inlet conduit to a scrubber and flooding the solid waste within the scrubber with water to thereby reduce the waste to slurry form, centrifugally separating air from the waste slurry by utilizing said suction to induce spinning of the slurry, pumping the separated slurry to a remote disposal site, expanding the air separated from the slurry by utilizing said suction to induce the expansion and thereby drying and cleansing the air, and exhausting the dried and cleansed air to the atmosphere.

4,124,410

SILICON SOLAR CELLS WITH LOW-COST SUBSTRATES

Peshotan S. Kotval, Hartsdale, and Harold B. Strock, North Tarrytown, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Nov. 21, 1977, Ser. No. 853,770
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 TF 58 Claims

1. A low-cost, multigrained, epitaxial n-on-p-on-p substrate planar diode comprising p-and-n-type epitaxial layers grown on a passive p-type, multigrained, silicon substrate, said layers duplicating the underlying substrate grain secondary structure, said silicon substrate having been produced by the process comprising:

a. removing silicon platelets from a solution of metallurgical grade silicon in a liquid metal solvent, thereby recovering partially purified, essentially iron-free silicon platelets with adherent impurities derived from said metal solvent;

b. melting said partially purified silicon platelets in contact with acid silica slag in a melting zone, the resulting slag oxidation removing residual and adherent impurities from said silicon; and

c. pulling refined metallurgical silicon boules from a melt of the thus-refined silicon on a rotating silicon seed rod,

whereby said substrate is produced at a substantially higher impurity level than in conventional high purity semiconductor grade silicon while the resulting low-cost diode has desirable solar cell properties.

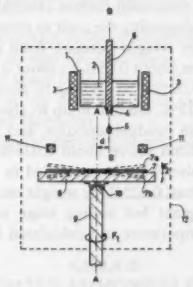
6. The product of claim 1 and including electrical contacts affixed to said n-type layer and to said substrate, said product constituting a solar cell with said contacts serving to control the flow of electricity produced by the photovoltaic effect upon absorption of sunlight by said solar cell.

4,124,411

METHOD OF PROVIDING A LAYER OF SOLID MATERIAL ON A SUBSTRATE IN WHICH LIQUID FROM WHICH THE SOLID MATERIAL CAN BE FORMED, IS SPREAD OVER THE SUBSTRATE SURFACE

Johannes Meuleman, Caen, and Jean-Pierre Besselere, Plumetot-par-Douvres, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1976, Ser. No. 720,009
Int. Cl.[2] H01L *31/00*
U.S. Cl. 136—89 TF 16 Claims



1. A method of providing a layer of solid polycrystalline semiconductor material on a flat substrate surface, for use as a solar cell in which a liquid material from which said solid polycrystalline semiconductor material is formed, is supplied dropwise to the substrate, while said substrate is given a rotating movement, characterized in that the rotating movement of said substrate is combined with at least one other periodic movement which produces a change of the position of the plane of said substrate surface, such that the points of the surface which are situated outside the point of intersection of the axis of the rotating movement change in height periodically with respect to said point of intersection.

4,124,412

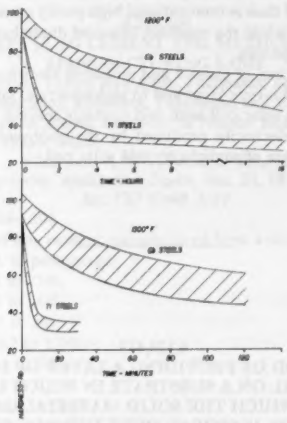
COLUMBIUM TREATED, NON-AGING, VACUUM DEGASSED LOW CARBON STEEL AND METHOD FOR PRODUCING SAME

James A. Elias, Middletown, and Rollin E. Hook, Dayton, both of Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Division of Ser. No. 107,077, Jan. 18, 1971, Pat. No. 3,761,324, which is a continuation-in-part of Ser. No. 15,415, Mar. 2, 1970, abandoned. This application Aug. 6, 1973, Ser. No. 386,158

Int. Cl.[2] C21D *7/14*

U.S. Cl. 148—2 **5 Claims**



1. A process of producing low carbon steel hot rolled strip and sheet stock having no yield point elongation, freedom from critical grain growth and enhanced yield strength after straining 20% and heating to high temperature for a short period of time, excellent surface characteristics and substantial freedom from inclusions, which comprises the steps of melting a steel containing a maximum carbon content of about 0.05% by weight; vacuum degassing the melt to obtain a steel consisting essentially of, by weight percent, from about 0.002% to about 0.015% carbon, about 0.05% to about 0.60% manganese, sulfur up to about 0.035%, oxygen up to about 0.010%, nitrogen up to about 0.012%, aluminum up to about 0.080%, phosphorus and silicon in residual amounts, and remainder essentially iron; adding from above about 0.025% to about 0.30% columbium, said columbium being added in an amount sufficient to result in at least 0.025% by weight uncombined columbium at the subsequent hot rolling stage as determined by analysis at room temperature and calculated from the formula

$$\%Cb_{uncomb.} = \%Cb_{total} - 7.75\%C_{total} - 6.65\left[\%N_{total} - \frac{\%Al_{acid\ sol.}}{1.93}\right] \text{where}$$

$$\left[\%N_{total} - \frac{\%Al_{acid\ sol.}}{1.93}\right] > 0,$$

when the amount of aluminum is insufficient to combine with all the nitrogen present in the steel; casting and solidifying the degassed steel; hot rolling the steel to strip and sheet thicknesses and coiling at a temperature up to about 1500° F (1090° K).

4,124,413

WEAR AND PITTING RESISTANT CAST IRON

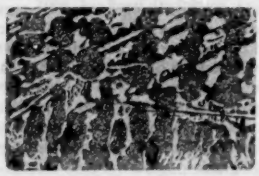
Yasuhiko Komatsu, and Shozo Kanbara, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 18, 1975, Ser. No. 559,420

Claims priority, application Japan, Mar. 18, 1974, 49-030832

Int. Cl.[2] C21D *5/00*

U.S. Cl. 148—3 **7 Claims**



7. A method of producing a wear resistant cast iron which comprises the steps of casting a melt consisting essentially of:

2.8–3.3% carbon,

1.5–2.1% silicon,

1.0–1.5% chromium,

0.6–0.8% molybdenum,

0.2–0.55 nickel,

not more than 0.05 phosphorus balance substantially all iron, to form a casting having a free cementite content of 20–40% by volume, and then hardening the resulting casting by heating it at 860°–950° C. for 1–10 hours, and then quenching it to produce a product having a Vickers hardness of Hv 750–900.

4,124,414

POST PHOSPHATING INHIBITING RINSE

Joseph V. Otrhalek, Dearborn; Raymond M. Ajluni, West Bloomfield Township, Oakland County, and Gilbert S. Gomes, Southgate, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed May 25, 1977, Ser. No. 800,558

Int. Cl.[2] C23F *7/10*

U.S. Cl. 148—6.15 R **4 Claims**

1. In a method of phosphating a ferrous metal surface, wherein the surface is treated to provide a coating of the iron phosphate or zinc phosphate type;

a separate and subsequent rinse step which comprises rinsing the phosphated metal surface with an aqueous solution consisting essentially of from about 0.40 to about 2.2 grams per liter of nitrite ions and about 0.05 to about 0.5 grams per liter of citrate ions.

4,124,415

PROCESS FOR HEATING METAL STRIPS, IN PARTICULAR NON-FERROUS METAL STRIPS

Willi Sporenberg, Hemer-Deilinghofen, and Reinhold Wagner, Neuss-Uedesheim, both of Germany, assignors to Sundwiger Eisenhutte Maschinenfabrik Grah & Co. and Aluminium Norf GmbH, both of Neuss, Germany

Filed Dec. 13, 1976, Ser. No. 749,662

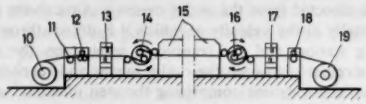
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1975, 2556057

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—13 **5 Claims**

2. Process for heating metal strips continuously, in particular non-ferrous metal strips, comprising heating the metal strip continuously without contact, by passing said metal strip at a velocity of from 5 to 300 m/min through an electromagnetic traveling wave working in the direction of the strip with a slippage with respect to the velocity of said traveling wave to

effect heating of the strip as it is advanced, and adjusting the temperature of said metal strip by adjusting at least one of the



synchronous velocity of the traveling wave and the voltage of the traveling wave.

4,124,416

PROCESS FOR THE HEAT TREATMENT OF COILS OF METALLIC STRIP, PREFERABLY OF ALUMINUM AND ALUMINUM ALLOYS

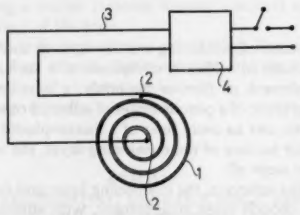
Mihaly Anka; Peter Lukacs; Dezso Gallo, all of Budapest; Jozsef Szabics, and Geza Szalay, both of Szekesfehervar, all of Hungary, assignors to Aluminiumipari Tervezo es Kutato Intezet/ALUTERV-FKI, Budapest; Szekesfehervari Konyufemmu, Szekesfehervar and Budapesti Muszaki Egyetem, Budapest, all of, Hungary

Filed Apr. 19, 1977, Ser. No. 788,792

Claims priority, application Hungary, Apr. 27, 1976, FE 969

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—13 **2 Claims**



1. A process for heat treating a metal such as aluminum or an aluminum alloy which comprises the steps of:

forming a coil having a plurality of turns from a strip of said metal with the turns being insulated from one another by lubricant layers and oxide layers on the surfaces of the strip and by an air gap formed during coiling of the strip;

applying a voltage across said strip in the coiled state thereof between electrodes connected to the ends of the strip of substantially 0.01 to 0.25 volts per turn and passing a current through said strip of the coil with an intensity of substantially 1,000 to 10,000 amperes, thereby heating the strip of said coil to a temperature between 150° C and 800° C, the intensity of said current being a function of the combined resistance of said layers and said gap;

maintaining the strip of said coil heated by the passage of said current therethrough at said temperature for a period of time; and

thereafter cooling said coil.

4,124,417

METHOD OF DIFFUSING IMPURITIES IN SEMICONDUCTOR BODIES

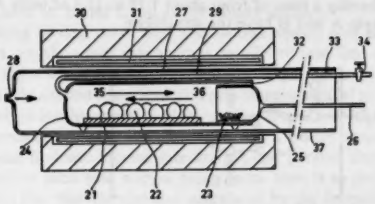
Norbert Sirot, Herouville St Clair, and Robert Thevenon, Ste Honorine du Faye, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 613,623, Sep. 15, 1975, abandoned. This application May 31, 1977, Ser. No. 801,925

Claims priority, application France, Sep. 16, 1974, 74 31243

Int. Cl.[2] H01L *21/223*

U.S. Cl. 148—189 **6 Claims**



1. A method of diffusing doping impurities in semiconductor bodies by the transfer of said impurities in the vapor phase, comprising the steps of:

(a) providing a vessel defining a space which has a controlled atmosphere and is exposed to the thermal rays of a furnace and comprises at one end thereof a restricted passage for communication with the ambient atmosphere, said vessel containing said semiconductor bodies,

(b) placing a source of impurities in a condensed form in said vessel near said passage,

(c) cleaning said space by means of gas which is introduced therein via the other end of said vessel thereof opposite to said passage,

(d) then closing said space with the exception of said passage,

(e) bringing said source to at least its evaporation temperature and transporting source vapor to said bodies,

(f) heating said bodies at at least the diffusing temperature,

(g) maintaining at least during said heating of said bodies a cold point in the space near said other end opposite to said passage,

(h) then, after a certain diffusion time, opening said vessel at said one end to remove said source,

(i) cleaning said space by means of a flow of gas, all of said gas flowing in the direction from said one end to said other end, and thereafter,

(j) decreasing the temperature of said bodies.

4,124,418

SILOXANE-COATED AMMONIUM PERCHLORATE AND PROPELLANT COMPOSITIONS MADE THEREWITH

Russell Reed, Jr., Ridgecrest, Calif.; Robert E. Meyer, Ogden, Utah; Graham C. Shaw, Garland, Utah, and Richard P. Cornia, Logan, Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed Apr. 19, 1973, Ser. No. 352,589

Int. Cl.[2] C06B *45/34*

U.S. Cl. 149—7 **15 Claims**

1. Finely divided ammonium perchlorate, the particles of which are coated with a strongly adherent coating consisting essentially of a perchlorate of an amine selected from alkylamines, aminoalkylamines, hydroxyalkylamines, mercaptoalkylamines and silanylalkylamines.

4,124,419
SELF-BONDING VARNISH FOR MAGNET WIRE AND MAGNETS PRODUCED USING SAID

Robert G. Keske, Will County, Ill., assignor to Standard Oil Company, Chicago, Ill.

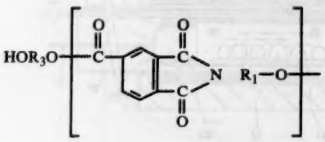
Division of Ser. No. 660,714, Feb. 23, 1976. This application Jul. 7, 1977, Ser. No. 813,500

Int. Cl.[2] **B05D** *5/12;* **B65H** *81/00;* **C09J** *5/02;* **H01B** *3/20*

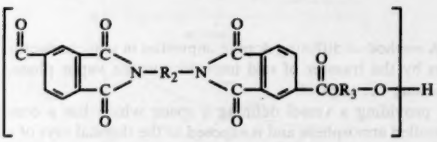
U.S. Cl. 156—51 **4 Claims**

1. The method of producing a magnet wire bearing a continuous self-bonded varnish top coat comprising applying a polyalkylenetrimellitate imide polyalkylenetrimellitate ester imide, having a ratio of from about 1:19 to 19:1 of units A and B wherein A and B have the structures:

A



B



and R_1, R_1 and R_3 are independently divalent alkylene radicals, varnish top coat to a magnet wire bearing at least one enamel subbing layer selected from the group consisting of a polyester, polyesterimide, polyimide and polyamide-imide, drying the polyalkylenetrimellitate imide polyalkylenetrimellitate ester imide coating, winding the wire to form a wound magnet, fabricating the wound magnet into an electrical component and bonding the polyalkylenetrimellitate imide polyalkylenetrimellitate ester imide varnish together to form a unitary electrical structure.

4,124,420
METHOD AND A DEVICE FOR PROVIDING WOVEN BANDS OR RIBBONS FROM TISSUE WOVEN BY A STANDARD WEAVING MACHINE

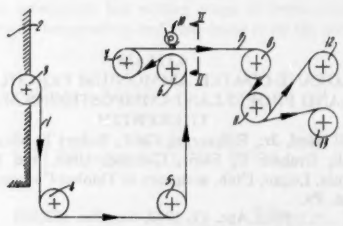
Dante Pastorelli, Gallarate, (Varese), and Giancarlo Saporiti, Cassano Magnago, (Varese), both of Italy, assignors to Nastrificio Eurotessile S.R.L., Varese, Italy

Filed Feb. 3, 1976, Ser. No. 654,952

Claims priority, application Italy, Oct. 6, 1975, 27991 A/75; Feb. 5, 1975, 83608 A/75

Int. Cl.[2] **D03D** *47/50;* **B32B** *31/00;* **D03D** *49/00*

U.S. Cl. 156—88 **12 Claims**



1. In a method of manufacturing a plurality of woven fabric ribbons woven of heat sealable material wherein warp and weft threads of different colors are interwoven with the weft threads being woven transversely into longitudinal warp threads of material which are positively drawn by outlet means through a weaving station to form a woven fabric having a plurality of distinct multi-color patterns across the width thereof separated by narrow selvages formed of heat sealable material, the woven fabric is tensioned transversely while between the outlet means and weaving station, the woven fabric is directed from the outlet means to a receiving station substantially at the velocity at which it is drawn through the weaving station, and the transverse tension on the woven fabric is relaxed between the outlet means and receiving station, the improvement comprising the step of applying sufficient heat to the narrow selvages between the distinct patterns to longitudinally slit and simultaneously seal the fabric in a cutting-sealing zone disposed between the outlet means of the weaving machine and the receiving station and at a location downstream of the outlet when the transverse tension in the fabric is relaxed to provide a plurality of ribbons of the multi-color fabric, each ribbon comprising a longitudinal row of the multi-color patterns, and directing each ribbon to the receiving station from the cutting-sealing zone.

4,124,421
METHOD OF PRODUCING MULTI-LAYERED AND SHAPED WALL COVERING MATERIAL OF CORRUGATED CARDBOARD

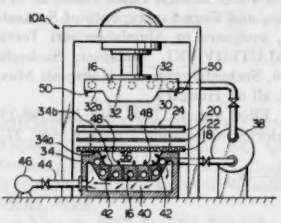
Toshihiko Fujii, Yokohama, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Feb. 4, 1977, Ser. No. 765,586

Claims priority, application Japan, Feb. 5, 1976, 51-10809

Int. Cl.[2] **B29C** *3/00*

U.S. Cl. 156—87 **7 Claims**



1. A method of producing a multi-layered and shaped wall covering material which is composed of a sustrate of corrugated cardboard of fibrous materials, a heat-insulating and cushioning layer of a porous material adhered onto one side of the substrate and an outer liner of a thermoplastic resin coated on the outer surface of the cushioning layer, the method comprising the steps of:

setting the substrate, the cushioning layer and the outer liner in an orderly piled arrangement, with adhesive materials interposed between the substrate and the cushioning layer and the outer liner, in a hot-press having a male die and a female die movable relative to each other, one of the male and female dies facing the substrate having a plurality of holes formed therein so as to establish fluid communication between a shaped surface thereof and a separate suction means:

heating the male and female dies to temperatures suitable for shaping of the piled materials and function of the adhesive materials;

press-shaping the piled materials between the male and female dies and simultaneously adhering the cushioning layer to both the substrate and the outer liner;

sucking air through said holes while the substrate is in contact with said shaped surface of said one die to attract the piled materials to said one die by

perforating the substrate from the outside to suck air from voids in the substrate and the cushioning layer when air is sucked through said holes by preliminarily forming a plurality of pin-like protuberances on said shaped surface

of said one die, said protuberances being shaped and sized such that a tip portion of each of said protuberances perforates the substrate and intrudes into the cushioning layer without arriving at the outer liner to allow the outflow of air from voids in the cushioning layer to voids in the substrate through perforations formed in the substrate by said protuberances; and

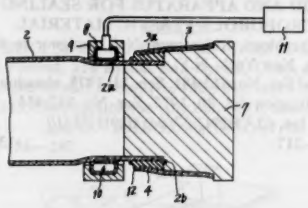
parting the other of the male and female dies from the outer liner, the suction of air being continued until said outer die parts from the outer liner.

4,124,422

METHOD OF PRODUCING FLEXIBLE PIPE WITH SOCKET SECTION

Hiroshi Kusano, Hyogo, Japan, assignor to Kubota, Ltd., Osaka, Japan

Filed May 11, 1976, Ser. No. 685,152
Claims priority, application Japan, May 13, 1975, 50-57747
Int. Cl.[2] B29D *23/00*; F16L *47/06, 23/02*
U.S. Cl. 156—165 **12 Claims**



1. A method of producing a flexible pipe with a socket in which to a prefabricated flexible pipe there is fixed a socket element overlapping the end portion of said flexible pipe, characterized by:

(a) elastically contracting the diameter of the one end portion of the pipe,

(b) fitting an elastic member on the outer surface of the one end portion of the pipe with an adhesive between the one end portion and the elastic member,

(c) bringing a socket element shaping mandrel against the end surface of the pipe,

(d) winding resin-impregnated reinforcing fiber around the outer surface of said elastic member and the mandrel to form the socket element, and

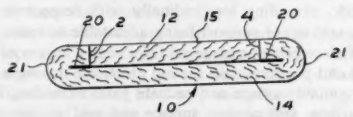
(e) relieving the elastic diametrical contraction after the resin is set.

4,124,423

METHOD OF FORMING SELVAGE EDGE FINISH ON MULTI-PLY BELTING

Floyd S. Zabron, West Seneca, and Richard F. Jankowski, Elma, both of N.Y., assignors to Albany International Corp., Albany, N.Y.

Filed Apr. 13, 1977, Ser. No. 787,287
Int. Cl.[2] D06C *25/00*
U.S. Cl. 156—88 **3 Claims**



1. A method of forming a mock selvage edge finish on a multi-ply, solid woven, textile belting, said multi-plies including a base outer ply and a cap outer ply, which comprises;

(a) providing said belting in a desired length and a width which is

(1) less than a width calculated by the formula:

$$(2 \times A) \times (2 \times B) - (2 \times C)$$

wherein A is the desired width of the finished belt, B is the total thickness of any plies between the base ply and the cap ply and C represents the thickness of the base outer plies; and

(2) more than a width calculated by the formula:

$$A + (2 \times B) - (2 \times C)$$

wherein A, B and C are as previously defined;

said belting having outer first and second square side edges along its length, a first side margin parallel to said first edge and having a width beginning at said first edge and extending towards said second edge, a second side margin parallel to said second edge and having a width beginning at said second edge and extending towards said first edge and a center zone between said first and second side margin and parallel thereto, the width of each side margin being more than B as defined above but less than the distance calculated by the formula:

$$A + B - C$$

wherein A, B and C are as previously defined, the sum of the widths of the side margins being equal to the distance calculated by the formula:

$$A + (2 \times B) - (2 \times C) - D$$

wherein A, B and C are as defined above and D equals the width of the center zone;

removing in a square cut the cap ply in the side margins, whereby there is exposed any intermediate plies in the side margins between the cap ply and the base ply and a portion of the inner surface base ply in the absence of intermediate plies;

removing in a square cut the outside edge of an intermediate ply in the side margin inwardly from the belting side edge a distance equal to one-half the width of the side margin plus B as previously defined, whereby a portion of the inner surface of the base ply is exposed;

(c) applying adhesive at least to one of the inner surfaces of said base ply and the exposed surfaces of any intermediate plies;

(d) folding each portion of the base ply free of overlying ply over so that the outer square edge abuts the square-cut center zone of said cap ply; and

(e) curing said adhesive;

whereby a mock selvage finish is formed on the side edges of said belting in the desired width.

4,124,424

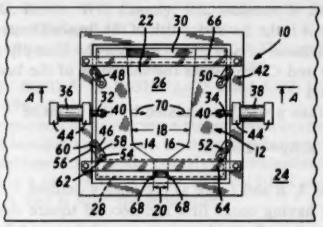
METHOD AND APPARATUS FOR MAINTAINING FABRIC FOLDS AND SHAPES DURING MANUFACTURE OF A FABRIC PRODUCT

Harold Preston, Nutley, N.J., assignor to Automated Components Inc., Bellville, N.J.

Filed Dec. 8, 1976, Ser. No. 748,460
Int. Cl.[2] C09J *5/00*
U.S. Cl. 156—155 **31 Claims**

1. A method for forming and maintaining a fabric piece in a desired configuration during manufacture, comprising the steps of applying adhesive to at least one surface of the fabric piece at least at selected locations thereof, forming the fabirc piece into the desired configuration in which parts of said surface including said selected locations with adhesive thereon

are opposed and bringing together at least said parts of said surface which are opposed under sufficient pressure to cause



said adhesive to adhere said parts of said surface together, and thereafter dissipating the adhesive.

4,124,425

METHOD OF MAINTAINING TIRE CORDS IN PARALLEL ARRAY FOR CALENDERING WITH ELASTOMERIC MATERIAL

Grover W. Rye, Cuyahoga Falls, and Richard L. Bell, North Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 405,246, Oct. 10, 1973, abandoned. This application May 31, 1977, Ser. No. 801,665

Int. Cl.[2] B29H *9/04*

U.S. Cl. 156—168 **5 Claims**

1. The method of preparing rubber article reinforcing wire or textile cords for embedment in unvulcanized rubber material by calendering, comprising gathering a moving plurality of independent separate individual cabled reinforcing cords from a conventional creel to form a moving array of parallel cords spaced to provide a desired end count, wherein said cords extend parallel to the direction of movement of the array, providing backing means in longitudinally continuous running length sheet form, coating said backing means with an adhesive cement compatible with said cords, bringing said array and the so-coated backing means into mutually adherent contact while said cement remains adhesive, said backing means providing the sole means for holding said cords in said desired end count, winding on a winding shell said array of cords together with said backing means, and thereafter conducting the array and backing means together from said shell in a direction parallel to said direction of movement to rubber material calendering means and calendering said unvulcanized rubber material on said cords, and progressively removing said backing means with said cement thereon from said array immediately before said array enters the calendering means, receiving the array of cords embedded in uncured rubber material and incorporating the so calendered array in a reinforced rubber article.

4,124,426

METHOD AND APPARATUS FOR PRODUCING A COLLAPSIBLY FOLDABLE PACKAGING SLEEVE HAVING A POLYGONAL CROSS-SECTION

Franz J. Saul, Guerzenicher Strasse 61, 5160 Dueren, Fed. Rep. of Germany

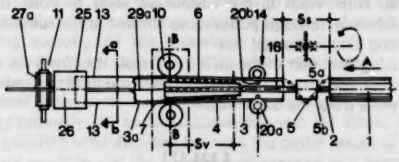
Filed Mar. 24, 1976, Ser. No. 669,841

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1975, 2538866; Mar. 25, 1975, 2538867; Jan. 19, 1976, 2601723

Int. Cl.[2] B65H *81/00*

U.S. Cl. 156—193 **18 Claims**

1. A method of producing a foldably collapsible packaging sleeve of polygonal cross-section, comprising the steps of forming tubular sleeve stock by wrapping a plurality of layers of glued thin material on a stationary mandrel, and, while still in the glue-wetted state, separating said stock into sections and shaping each of said sections into a polygonal cross-section with at least one continuous folding edge impressed into the sleeve wall and extending in the longitudinal direction of said sleeve at each of the longitudinally extending edge corners of the polygonal cross-section, the shaping operation to form the polygonal cross-section being simultaneous with the formation



of the folding edges so that the compressing and compacting at each of said edges resulting from being so impressed is accompanied by stretching of the sides of said polygon into a straight condition.

4,124,427

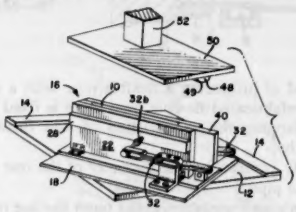
METHOD AND APPARATUS FOR SEALING A MICROPOROUS PLASTIC MATERIAL

Camillo M. Vecchiotti, Ridgewood, N.J., assignor to Amerace Corporation, New York, N.Y.

Continuation of Ser. No. 612,481, Sep. 11, 1975, abandoned. This application Jul. 20, 1977, Ser. No. 817,454

Int. Cl.[2] B29C *27/04;* **B29D** *23/10*

U.S. Cl. 156—217 **13 Claims**



2. Apparatus for heat sealing two lapped end portions of a sheet material prefolded to form a sleeve having a hollow interior, said apparatus having a lower support and an upper support, said upper support adaptable for movement with respect to said lower support, wherein the improvement comprises:

a. an electrode, said electrode being mountable relative to said lower support for receiving said sheet material, said electrode being a platen having a shape complementary to a shape formed by said hollow interior of said sleeve;

b. a clamping means, said clamping means being adjustably adapted for positioning said prefolded sheet material and aligning said two lapped end portions, relative to said platen, to effect an optimum transfer of heat energy to said lapped end portions; and

c. heat supplying means, carried by said upper support, for applying a predetermined amount of heat energy to said material to seal said lapped end portions together, and wherein said heat applying means comprises a second electrode, extending longitudinally with respect to said platen, said upper support being adjustable to cause said second electrode to engage said sleeve in a region of said lapped end portions, said second electrode having a flattened contact surface and arcuate sides extending from said surface, said contact surface and said arcuate sides permitting transfer of said heat energy only to said lapped end portions of said sheet material, said arcuatesides preventing contact of said second electrode with fold lines defining said end portions whereby cracking along said fold lines is prevented.

13. A method for heat sealing two lapped end portions of a

sheet material prefolded to form a sleeve having a hollow interior, which comprises:

a. positioning said prefolded sheet material on an electrode so that said end portions of said sheet material overlap each other and said electrode serves as a platen having a shape conforming to a shape formed by said hollow interior of said sleeve;

b. urging the opposed walls of said prefolded sheet material which extend at an angle to said lapped end portions against said platen to effect alignment of said overlapped end portions for transfer of heat energy thereto; and

c. engaging said prefolded sleeve in the region of said aligned overlapped end portions with a second electrode to permit said transfer of heat energy to the material of said end portions between the fold lines defining said end portions and preventing engagement of said second electrode with said fold lines to dielectrically heat seal said end portions together without causing cracking of said end portions along said fold lines.

4,124,428

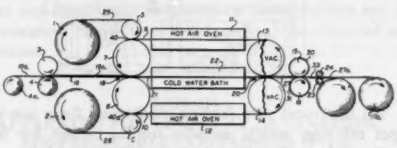
PROCESS OF MAKING SYNTHETIC SUEDE

Norman Forrest, 216 Byram Rd., Byram, Conn. 10573

Continuation-in-part of Ser. No. 738,918, Nov. 4, 1976, Pat. No. 4,044,183. This application Aug. 22, 1977, Ser. No. 826,629

Int. Cl.[2] B32B *33/00*; D06C *11/00*

U.S. Cl. 156—243 **8 Claims**



1. A method of continuously and simultaneously producing two separate rolls of a synthetic suede product which comprises the following sequential step:

(a) continuously feeding two polyurethane films onto two separate preheated, endless silicone rubber molding bands, the outer surfaces of which are provided with a multiplicity of cavities, and forcing a major portion of each of said polyurethane films into said molding band cavities;

(b) continuously feeding the thus treated polyurethane films into a nip formed by two rotating cylinders, while simultaneously feeding two separate webs of fibrous material into said nip in between the polyurethane films to provide substrates;

(c) continuously compressing the resulting assembly in said nip at a temperature of from about 385° to 410° F. and at a pressure of from about 65 to 100 psi whereby the remaining portion of the polyurethane films become affixed to adjacent substrate material;

(d) continuously passing the assembly compressed between molding bands into a cold water bath maintained at a temperature sufficiently cold to solidity any molten polyurethane feed material;

(e) continuously stripping the assembly composed of two separate layers, each layer comprising a substrate and outward extending polyurethane fibers affixed thereto, from the molding band by passing the molding bands over a pair of rotating cylinders provided with an internal vacuum and gripping the separate layers with a pair of rotating cylinders covered with card clothing; and

(f) continuously winding up two rolls of the stirpped layers having outwardly extending fibers affixed to the outer surfaces of the substrates and constituting said synthetic suede product.

4,124,429

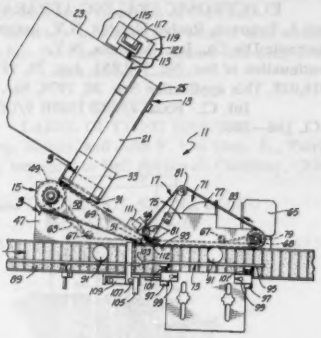
LABEL APPLICATOR WITH BELT TRANSPORT

Michael Crankshaw, Santa Fe Springs, Calif., assignor to Label-Aire Inc., Fullerton, Calif.

Filed Jul. 29, 1977, Ser. No. 820,205

Int. Cl.[2] B65C *9/18, 9/34*

U.S. Cl. 156—364 **10 Claims**



1. A label applicator for applying labels to articles wherein the labels are provided on an elongated backing strip and the articles are conveyed through a labeling station, said label applicator comprising:

means for moving the backing strip with the labels thereon longitudinally of the backing strip through a label removal station;

means at the label removal station for peeling at least one of the labels from the backing strip;

retaining means at the label removal station for receiving and releasably retaining said one label when said one label is at least partially removed from the backing strip;

a transport having movable means for moving labels in a first direction from a first location to a second location;

first means responsive to at least one of the articles being in a predetermined position for transferring said one removed label from said retaining means to the transport at the first location;

a wrap around label applicator;

means for transferring said one label from the transport at the second location to said wrap around label applicator; and

said wrap around label applicator including means for wrapping said one label at least part way around said one article.

4. A label applicator for applying labels to articles wherein the labels are provided on an elongated backing strip and the articles are conveyed through a labeling station, said label applicator comprising:

means for moving the backing strip with the labels thereon longitudinally of the backing strip through a label removal station;

a peeling bar at the label removal station and having a peeling surface over which the backing strip can be drawn by said moving means for peeling at least one of the labels from the backing strip;

retaining means at the label removal station for receiving and releasably retaining said one label at the label removal station when said one label is at least partially removed from the backing strip;

a wrap around label applicator;

a transport having movable means for moving labels in a first direction from a first location to the wrap around label applicator;

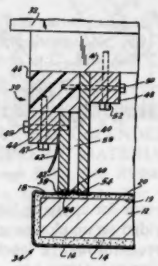
said peeling surface extending generally in said first direction whereby said moving means can draw the backing strip over the peeling bar in a direction generally transverse to said first direction;

first means for transferring said one removed label from said retaining means to the transport at the first location; and said wrap around label applicator receiving said one label from said transport and including means for wrapping said one label at least part way around said one article.

4,124,430
ELECTRONIC SEALING APPARATUS

Everett A. Peterson, Roslyn Heights, N.Y., assignor to Peterson Electronic Die Co., Inc., Mineola, N.Y.

Continuation of Ser. No. 700,853, Jun. 29, 1976, Pat. No. 4,016,025. This application Sep. 30, 1976, Ser. No. 728,046
Int. Cl.[2] B32B *19/02;* H05B *9/04*
U.S. Cl. 156—380 **7 Claims**



1. An electrode for use in sealing layers of thermoplastic material together from one side of the layers, said electrode comprising, a support, a first conductive element mounted on said support and adapted to be connected to a source of high frequency energy, a second conductive element mounted on said support in spaced relation to said first conductive element and adapted to be connected to an electrical ground; means for electrically insulating said first and second elements from each other; and a solid layer of insulating material located between said first and second elements; said first and second conductive elements each having exposed free end portions located in adjacent, but slightly spaced, relation to each other.

4,124,431
DIMENSIONALLY STABLE, CALENDERED VINYL FILM

Kurt M. Schramer, and Don O. Ocampo, both of Newburgh, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 15, 1976, Ser. No. 667,223
Int. Cl.[2] C09J *3/16;* B29D *7/14*
U.S. Cl. 156—309 **5 Claims**

1. A process for making an outdoor marking film which comprises:

(a) forming a calenderable film forming composition containing from about 50% to about 72%, by weight, polyvinyl chloride resin and from about 14% to about 20%, by weight, of plasticizer, said weight ratio of plasticizer to resin being about 0.25;

(b) calendering said film forming composition to form a vinyl film therefrom;

(c) heat and pressure stabilizing said vinyl film by subjecting the film to sequential heatings in the range of from about 220° F. to about 250° F. and from about 265° F. to about 285° F. and embossing said film at a pressure of from about 130 psi to about 160 psi at a temperature of about 40° F. to about 60° F.;

(d) coating an acrylic adhesive having high creep and shrinkage resistance on one side of release paper;

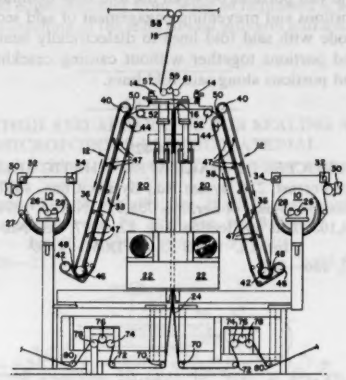
(e) drying said adhesive after it has been coated on said release paper; and

(f) laminating the product of step (e) to the vinyl film of step (c) to yield a film construction having a maximum shrinkage of about 0.3%.

4,124,432
CONVEYING MECHANISM FOR YARNS IN PILE FORMING APPARATUS

Martin L. Abel, Franklin, Mich., assignor to Permalock Company, Auburn Heights, Mich.

Continuation of Ser. No. 458,316, Apr. 5, 1974, abandoned. This application Jul. 7, 1977, Ser. No. 813,451
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.[2] D05C *15/00*
U.S. Cl. 156—435 **5 Claims**



1. An improved yarn feeding mechanism for a non-woven carpet machine which includes feeding means for feeding strands of yarn to said machine, supply means for supplying said strands to the feeding means, advancing means for advancing a layer of backing material, application means for applying bonding material to one side of the layer of backing material, and embedding means including a pair of elongated wire-like members for embedding the strands in the bonding material after it is applied to the backing material, the improvement comprising a first roller with a groove in the outer surface thereof for receiving and guiding each strand, a second roller disposed parallel to the first roller and in engagement with the outer surface thereof for maintaining each strand in its respective groove, moving means for rotating said rollers and pulling the strands from the supply means and toward the embedding means, the moving means being synchronized with the advancing means and embedding means.

4,124,433
APPARATUS FOR APPLYING A DECORATION TO A CYLINDRICAL BODY

Frank J. Herdzina, Schaumburg, Ill., and Patrick F. Urso, Longview, Wash., assignors to American Can Company, Greenwich, Conn.

Filed Jun. 6, 1977, Ser. No. 803,767
Int. Cl.[2] B65C *3/12*
U.S. Cl. 156—456 **12 Claims**

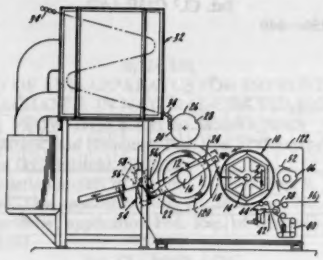
1. Apparatus for transferring a decoration from one generally arcuate surface to the outer surface of a cylindrical body comprising:

(A) a first rotary member adapted to support said one surface;

(B) a second rotary member opposed to the first on a center line joining their axes, and being equipped with circumferentially spaced support means, each at the end of a fixed radius, for presenting a cylindrical body rotatably to said one surface in the nip area between the two surfaces when

approaching and departing from one another during rotation of said members;

(C) means to rotate said members synchronously, sequentially to move each cylindrical body through the nip, first along an approach arc on one side of the center line, then through said center line and finally along a departure arc on the other side of the center line, relative to said one surface; and



(D) said one surface having an arcuate portion of variable radius, departing from a true circle, so configured as to continuously follow and maintain substantially continuous arcuate contact with the outer surface of said cylindrical body along a substantially straight line bisecting the nip area, at right angles to said center line, commencing at a point on the approach arc, continuing through the center line and terminating at a point on the departure arc, the decoration being transferred during the time of said contact.

4,124,434
APPARATUS FOR LINING BY LAMINATION AIR-PERMEABLE CONTAINERS WITH THERMOPLASTIC SHEETING OR FILM

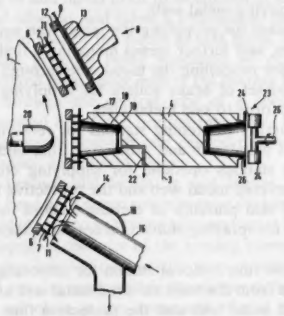
Fritz Wommelsdorf, and Werner Schmidt, both of Hamburg, Fed. Rep. of Germany, assignors to Maschinenfabrik Rissen GmbH, Hamburg, Fed. Rep. of Germany

Filed Oct. 26, 1976, Ser. No. 735,774

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1975, 2547814; Jun. 18, 1975, 2627379

Int. Cl.² B32B *27/10;* B65D *5/56*

U.S. Cl. 156—475 **12 Claims**



1. In an apparatus for heating and deep drawing of thermoplastic film for lining air-permeable containers by lamination, said apparatus including

a mold for supporting a container to be lined by deep drawing the film therein,

means for holding the film,

means for heating the held film, and

means for deep drawing the film into the container,

the improvement in said holding means for maintaining the film in a plane state, comprising

a plurality of pins arranged in parallel to each other and perpendicular with the plane of said film,

said pins piercing said film while holding the film,

a first set of said plurality of pins being located at a distance opposite a second set of said plurality of pins, thereby bounding the area to be deep drawn, said pins being transverse to the shrinkage direction of the film,

the distance between said first and second sets remaining constant while the film is being heated and deep drawn.

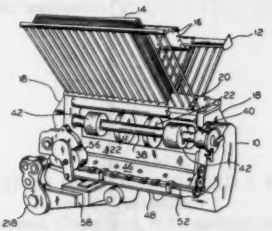
4,124,435
LABEL CUTTING HEAD

C. Roscoe Stump, Sidney, and John F. Van Dam, Jr., Fairfield, both of Ohio, assignors to Bell & Howell Company, Chicago, Ill.

Filed Dec. 19, 1977, Ser. No. 862,137

Int. Cl.² B32B *31/00*

U.S. Cl. 156—521 **6 Claims**



1. Apparatus for preparing address labels from a name and address list band;

said name and address band having transport means along the sides of said band;

said band including names and addresses printed in a plurality of columns across said band, and a plurality of crosswise lines of names and addresses linerally disposed on said band;

a guillotine cutting blade for cutting said band into strips, each said strip containing a single line comprising a plurality of names and addresses separated by spaces;

means associated with said transport means for incrementally advancing said band into the path of said guillotine cutting blade a distance equal to the desired height of a single label,

means for trimming off said transport means after said band has moved a preselected distance;

platen means for receiving said strip after said strip has been cut from said band by said guillotine blade;

said platen including means to transport said strip away from said guillotine blade and into the path of a rotary blade assembly located adjacent one end of and at right angles to said guillotine blade;

means associated with said rotary blade assembly for capturing said strip and advancing said strip past said rotary blade assembly where said strip is cut into labels of selected length;

means for receiving said labels after said labels have been cut from said strip and applying glue to the underside of said label; and

means for applying said glue-bearing label to a mailing piece;

the improvement comprising means for varying the amount of incremental advance of said band into the path of said guillotine cutting blade to vary the height of each label cut by said apparatus,

said last named means including power input means,

reciprocating linkage arm means driven by said power input means;

said linkage arm means removably connected to a ratchet

pawl operating means including a ratchet pawl operatively connected to a ratchet drive, said ratchet drive connected to said means for incrementally advancing said band into the path of said guillotine blade;

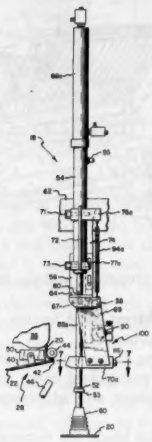
said ratchet pawl operating means including a plurality of connecting means for said linkage arm means whereby the throw of each movement of said ratchet pawl varies depending upon which of said plurality of connecting means is used to connect said linkage arm to said ratchet pawl operating means.

4,124,436

CYLINDER LABEL APPLIER

Charles R. Pettis, Jr.; Victor Del Rosso, both of Ithaca, and John W. Lindstrom, Newfield, all of N.Y., assignors to Hi-Speed Checkweigher Co., Inc., Ithaca, N.Y.

Filed May 2, 1977, Ser. No. 793,083
Int. Cl.[2] B65C 9/26
U.S. Cl. 156—542 **14 Claims**



1. An improved label applying apparatus for applying labels having pressure sensitive adhesive on one side thereof to articles being transported along a conveyor without touching the adhesive sides of the labels, said apparatus of the type adapted to receive labels from a label source, said improved apparatus comprising:

(a) first means for receiving said label and for moving said label into contact with a label receiving surface of the article, said first means mounted for reciprocation along a direction substantially perpendicular to the label receiving surface of the article;

(b) second means operatively connected to said first means for reciprocating said first means along said direction toward said article;

(c) third means operatively engaging said first means for causing said first means to rotate through a selected angle around an axis of rotation parallel to said direction while said label is moving toward said article, said third means including a cam surface having a helical portion and a means for engaging said cam surface and for rotating said first means consistant with said helical portion; and

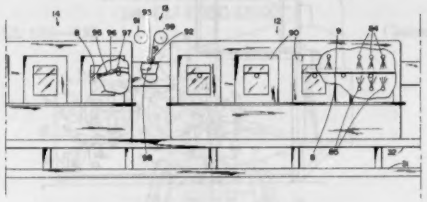
(d) means for adjustably positioning one of said cam surface and said cam surface engaging means relative to the other along said direction without repositioning said first means, whereby the various different relative positions of said cam surface and said engaging means cause said first means to rotate through various different angles when said first means moves said label toward said article.

4,124,437

SYSTEM FOR ETCHING PATTERNS OF SMALL OPENINGS ON A CONTINUOUS STRIP OF METAL

Herbert M. Bond, St. Paul; Charles E. Ring, Minneapolis; John A. Edgar, St. Paul; Ronald Bennett, Minneapolis; Willis K. Paul, Bloomington, and Roland N. Harshbarger, St. Paul, all of Minn., assignors to Buckbee-Mears Company, St. Paul, Minn.

Filed Apr. 5, 1976, Ser. No. 673,598
Int. Cl.[2] C23F 1/02
U.S. Cl. 156—640 **12 Claims**



1. The process of etching a continuous metal web to produce a plurality of openings therein comprising;

applying a first resist pattern on one side of a web and a second resist pattern on the opposite side of the web, the first resist pattern defining openings which have a minimum dimension less than the opening defined by the second resist pattern;

sealing a protective film on top of the first resist pattern;

propelling the web and protective film through an etching station;

simultaneously applying etchant on top of the protective film and to the second resist pattern;

removing the protective film located on top of the first resist pattern;

applying etchant to both sides of resist coated metal web to etch completely through the web to produce a plurality of openings.

6. An etching system for etching a continuous strip of resist coated metal web to produce an article having a plurality of openings having a minimum dimension on the order of the thickness of the material, comprising:

a first station for applying a film of protective material to one side of a continuously moving metal web;

first means for securing the film to one side of the continuously moving metal web;

further means for propelling the metal web and the protective film, said further means including a first set of drive rollers for propelling the metal web through said system, a second set of brake rollers for supplying a continual braking force to said metal web;

a first plurality of etching stations for receiving the resist covered metal web and protective film, said plurality of etching stations operable for supplying etchant to the resist covered metal web and the protective film wherein each of said plurality of etching stations includes spray nozzles for spraying etchant on opposite sides of the metal web;

a protective film removal station for removing the protective film from the resist covered metal web after the resist covered metal web and the protective film have passed through said first plurality of etch stations, said protective film removal station including means for removing the protective film and further means for preventing the metal web from being pulled from its plane of travel;

a second plurality of etching stations for supplying etchant to both sides of the resist covered metal web after the protective film has been removed; and

said first plurality of etching stations located before said protective film removal stations and said second plurality

of etching stations located after said protective film removal stations.

4,124,438

METHOD OF AND APPARATUS FOR IMPROVING THE HEAT EXCHANGE IN NATURAL-CIRCULATION AND FLOW-THROUGH EVAPORATORS

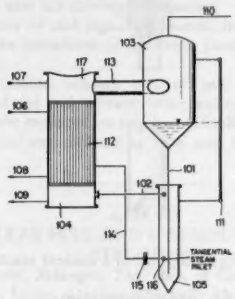
Konrad Mattern, Bad Homburg, Fed. Rep. of Germany, assignor to Ekono Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 611,643, Sep. 9, 1975, abandoned. This application May 20, 1977, Ser. No. 798,882

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1974, 2443393

Int. Cl.[2] B01D *1/00*

U.S. Cl. 159—47 R **2 Claims**



1. A method of improving heat exchange in natural-circulation and flowthrough evaporators, comprising the steps of:

a. passing a liquid upwardly through a multiplicity of upright externally heated heating tubes from inlets at the bottom thereof to evaporate said liquid at least partially within said tubes;

b. applying to said liquid prior to its admission to said multiplicity of tubes at said inlets a hydrostatic pressure heat greater than that of the liquid at said inlets, said greater hydrostatic pressure being produced by draining feed liquid derived from upper ends of the heating tubes downwardly through the central tube of a concentric-tube siphon located below the heating-tube inlets and causing the liquid passed through said central tube to rise in an annular space within said siphon;

c. contact-heating said liquid at said higher hydrostatic pressure head with direct steam to raise the temperature of said liquid at least to its boiling temperature at the pressure of said liquid at the inlet of the heating tubes, and direct steam being injected tangentially from outside the siphon into said annular space within the siphon at the lower end thereof and close to the lower end of said central tube, thereby contacting the steam with the rising liquid in said space and inducing a swirling motion;

d. passing the resulting vapor-liquid mixture from the top of the annular space to said inlets of the heating tubes; and

e. separating vapor from liquid from said upper ends of said heating tubes and delivering the separated liquid and the drained feed liquid to the central tube of the siphon, the separation of the vapor from liquid being carried out at a location above said siphon.

4,124,439

HIGH BULK PAPER OF GREAT STIFFNESS

Guido Dessauer, Dusseldorf-Gerresheim, Germany, assignor to Feldmuhle Aktiengesellschaft, Dusseldorf, Germany

Filed Jun. 21, 1974, Ser. No. 481,490

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1973, 2332294

Int. Cl.[2] D21H *3/38*

U.S. Cl. 162—146 **11 Claims**

1. A light weight paper of relatively high stiffness, said paper essentially consisting of interengaged fibers, 10% to 75% of the weight of said fibers consisting of cellulose fibers uniformly distributed throughout said paper and impregnated with a polymer selected from the group consisting of polyvinyl alcohol and a starch ether having available hydroxyl groups, a sufficient number of said hydroxyl groups being cross-linked by a cross-linking agent to reduce the resiliency of said cellulose fibers as compared to otherwise identical cellulose fibers not so impregnated, the remainder of 90% to 25% of said interengaged fibers being free of said polymer and said cross-linking agent, said paper having a bulk density of 0.35 to 0.6 gram per cubic centimeter.

4,124,440

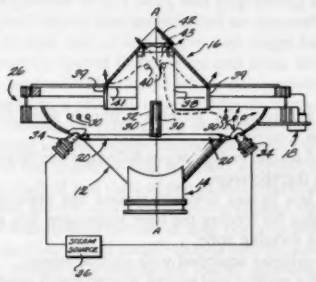
CHIP BIN STEAM DISTRIBUTOR WITH A VIBRATING DISCHARGE

Michael I. Sherman, Glens Falls, N.Y., assignor to Kamyr Inc., Glens Falls, N.Y.

Filed May 23, 1977, Ser. No. 799,782

Int. Cl.[2] D21C *7/08, 7/10*

U.S. Cl. 162—246 **10 Claims**



1. A chips bin including a generally funnel-shaped stationary top portion, an oscillatable bottom portion including a flexible material chips outlet, an activator cone connected to said bottom portion by a plurality of arms extending outwardly from said activator cone, said activator cone disposed above said chips outlet and said activator cone and said chips outlet being generally concentric, a vertical straight line extending generally between the centers thereof, power means for oscillating said bottom portion with respect to said top portion in a dimension generally parallel to said straight line, and means for adding steam to the interior of the volume defined by said top portion and said bottom portion, wherein the improvement comprises

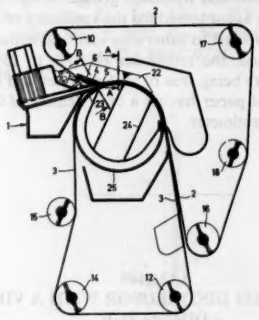
said means for adding steam to said interior volume comprising a plurality of steam ports formed in each of said support arms of said activator cone, and means for steaming the chips by supplying steam to said arms for passage through said ports into said volume, and means for introducing steam underneath said activator cone.

4,124,441

SHEET FORMING APPARATUS INCLUDING EDGE SEALS FOR FORMING WIRES

Erik A. Nykopp, Tampere, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed Feb. 4, 1977, Ser. No. 765,694
Claims priority, application Finland, Feb. 6, 1976, 760291
Int. Cl.[2] D21F *1/00*
U.S. Cl. 162—301 3 Claims



1. An apparatus for forming a fibrous sheet from a fiber suspension, comprising:

first and second endless wires defining a converging forming zone therebetween;

a feed box having first and second lips defining an outlet opening for feeding the fiber suspension into an inlet end of the forming zone;

a wire cylinder equipped with suction means;

means for guiding said second wire so that it passes along the surface of said wire cylinder at least in the region of said sheet forming zone,

said second wire being in sealing contact with said second lip of said feed box;

means including a breast roll for guiding said first wire into sealing contact with said first lip of said feed box, said breast roll being on the opposite side of said feed box from said wire cylinder, said first wire being arranged to be carried by the sheet being formed along said forming zone; and

means defining substantially parallel side walls extending along said forming zone beyond the outlet opening of said feed box in contact with the side edges of one of said wires for defining the sides of said forming zone;

and wherein the distance between the side walls is substantially equal to the width of the first wire, but essentially smaller than the width of the second wire for sealing the edges of the first wire against the inner surface of the side walls and for sealing the edges of the side walls against the second wire.

4,124,442

REGULATING ROD DRIVE OF NUCLEAR REACTOR

Ivan I. Zhuchkov, ulitsa 22 Partsiezda, 6/2, kv. 60; Vladimir S. Gorjunov, ulitsa Shalyapina, 15, kv. 124; Boris I. Zaitsev, ulitsa Shalyapina, 15, kv. 131; Nikolai E. Derevyankin, ulitsa Sovnarkomovskaya, 30, kv. 115; Vladimir A. Petrov, ulitsa Zhitomirskaya, 9-a, kv. 18; Semen D. Istomin, ulitsa Shalyapina, 20, kv. 60; Davyd I. Kovalenchik, mikroraion Kuznechikha-1, 8, kv. 55; Evgeny A. Arkhipov, ulitsa Petrovskogo, 5, kv. 20; Valery I. Serebryakov, ulitsa Novosovetskaya, 12, kv. 4, and Vladimir S. Kachalin, ulitsa Gogolya, 16, kv. 4, all of Gorky, U.S.S.R.

Filed May 10, 1977, Ser. No. 795,542
Int. Cl.[2] G21C *17/00, 7/08*
U.S. Cl. 176—36 C 18 Claims

1. A drive of a regulating rod of a nuclear reactor, comprising:

an electromotor having an output shaft;

a means for transmitting the torque of said electromotor, kinematically coupled to said output shaft of said electromotor;

a hermetically sealed housing;

a connection shaft arranged in said hermetically sealed housing and kinematically coupled to said torque transmitting means;

a self-braking reduction gear arranged in said hermetically sealed housing and kinematically coupled to said torque transmitting means of said electromotor;

a bar;

a mechanism for driving said bar, arranged in said hermetically sealed housing and kinematically coupled to said self-braking reduction gear;

a casing;

profiled grips mechanically connected to said bar of said bar driving mechanism;

a spur-gear drive of said mechanism for driving said bar, kinematically coupled to said self-braking reduction gear;

a disengaging means of said bar driving mechanism, kinematically coupled to said self-braking reduction gear;

a casing of said disengaging means;

a driving element of said disengaging means, arranged in the latter's casing and kinematically coupled to said self-braking reduction gear having an internal cavity;

a driven element of said disengaging means, arranged in said internal cavity of said driving element and having an internal cavity;

said bar being arranged in said internal cavity of said driven element;

a kinematic pair for converting rotative motion into reciprocating motion of said mechanism for driving said bar, arranged in said hermetically sealed housing of said drive;

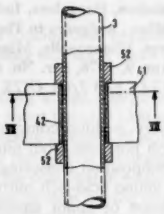
a gear of said kinematic pair, connected to said driven element;
a toothed member of said kinematic pair, the teeth being provided on its outer surface;
said toothed member being rigidly coupled to said bar and engaged with said gear;
a jacket housing the upper portion of said toothed member;
an inductive transducer of the lower position of said regulating rod of said mechanism for driving said bar, mounted on said jacket;
a mechanism for controlling said profiled grips, arranged in said hermetically sealed housing of said drive and kinematically coupled to said self-braking reduction gear and said bar driving mechanism;
a rotary tube of said mechanism for controlling said profiled grips, coaxially interposed between said toothed members and said jacket;
a control pin of said mechanism for controlling said profiled grips, arranged inside said toothed member, one of its ends being rigidly connected to said rotary tube, whereas its other end is connected to said profiled grips to control them;
a signalling means to signal the engagement of said drive with said regulating rod, arranged in said hermetically sealed housing of said drive and electromagnetically coupled to said bar driving mechanism;
an armature of said signalling means, interacting with said inductive transducer of the lower position of said regulating rod;
a spring-loaded sensing rod of said signalling means, whereof one end interacts with said regulating rod;
a guide tube mounted on said hermetically sealed housing of said drive and interacting with said bar driving mechanism.

4,124,443

NUCLEAR FUEL-ROD ASSEMBLY SUPPORT STRUCTURE

Helmut Bezold, Erlangen, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Fed. Rep. of Germany

Filed Oct. 3, 1974, Ser. No. 511,716
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1973, 2350700
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—78 **5 Claims**



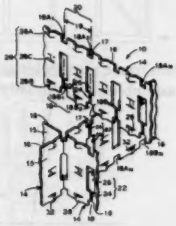
1. A nuclear fuel rod assembly support structure comprising top and bottom end pieces, a plurality of fuel rod spacer grids having openings therethrough, and control-rod guide tubes having top and bottom ends respectively fastened to said top and bottom end pieces and holding these pieces interspaced, said guide tubes being inserted through said openings in said spacer grids and the spacer grids being positioned between said end pieces, wherein the improvement comprises sleeves through which said guide tubes are inserted with said spacer grids in each instance clamped between two of these sleeves with the sleeves engaging the spacer grid's top and bottom surfaces and fixed to the guide tube by solidified molten metal, said guide tubes and spacer grids being respectively made of different metals which are at least difficult to fix together by solidified molten metal, and said sleeves being made of the same metal as are said guide tubes, said support structure having means for mechanically locking said spacer grids and said sleeves against relative rotation and said means being formed by said spacer grids having walls surrounding said openings and said sleeves having cutouts which engage portions of said walls.

4,124,444

NUCLEAR FUEL ROD SUPPORTING ARRANGEMENT

Felix S. Jabsen, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Division of Ser. No. 105,388, Jan. 11, 1971, Pat. No. 3,933,583, which is a division of Ser. No. 774,148, Nov. 7, 1968, Pat. No. 3,665,586. This application Nov. 5, 1975, Ser. No. 629,471
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—78 **1 Claim**



1. A member used within a nuclear reactor fuel element spacer grid comprising a generally planar strip having longitudinally extending faces on opposite sides of said strip and edges generally transverse to said faces, said strip having a plurality of slots formed therein that intersect and are generally perpendicular to at least one of said edges, said edges being interrupted at equally spaced intervals by said slots, each of said slots being longitudinally aligned with a corresponding slot in the opposite edge, a plurality of longitudinally aligned narrow slits each respectively terminating in a wider symmetrically shaped opening to form paddle-shaped cutouts that are situated essentially in the middle of said strip and intermediate of said strip edges, each of said slots of one of said edges terminating in one of said narrow slits longitudinally aligned therewith, a plurality of indentations formed in strip portions that are generally intermediate of said paddle-shaped cutouts, said indentations being formed at equidistantly spaced intervals throughout the length and breadth of said strip in the edges of one face of said strip portion and in the center of the opposite face of said strip portion so as to protrude beyond the strip plane.

4,124,445

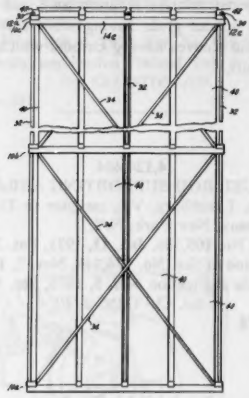
STORAGE RACK FOR FUEL CELL RECEIVING SHROUDS

Leslie Mollon, Southfield, Mich., assignor to Brooks & Perkins, Incorporated, Southfield, Mich.

Filed Oct. 6, 1976, Ser. No. 730,216
Int. Cl.[2] G21C *19/32*
U.S. Cl. 176—87 **8 Claims**

1. A rack for receiving open-ended tubular cannisters for storing radioactive nuclear fuel cells, said rack comprising a plurality of reticulated vertically spaced horizontally extending rigid frame assemblies, vertical tension rods extending between the top, bottom and intermediate frame assemblies, vertical tubular spacer elements through which said rods pass,

extending between adjacent frame assemblies with their ends in abutment therewith, and diagonal tension braces extending



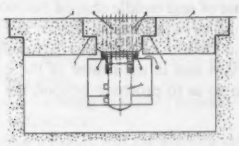
between adjacent frame assemblies and connected at their ends to said frame assemblies substantially at the corners thereof.

4,124,446

APPARATUS AND METHOD FOR FILTERING RADIOACTIVE LIQUID

José-Luis de Francisco-Sainz, Guecho-Algorta, Spain, assignor to Sener, Tecnica Industrial y Naval, S.A., Vizcaya, Spain

Filed Nov. 24, 1976, Ser. No. 744,594
Claims priority, application Spain, Nov. 25, 1975, 442.921
Int. Cl.² G21C *15/00*
U.S. Cl. 176—87 **12 Claims**



1. In a filtering system for the treatment of radioactive fluids wherein said filter assembly is surrounded by chamber walls forming a radiation shielding, the improvement comprising:

a filter casing secured to a wall of said radiation shielding,

a filter element removably positioned in said filter casing,

a filter casing cover including radiation shielding means for said filter element, said filter casing cover and radiation shielding means being shaped to form a removable closure in one of said radiation shielding walls,

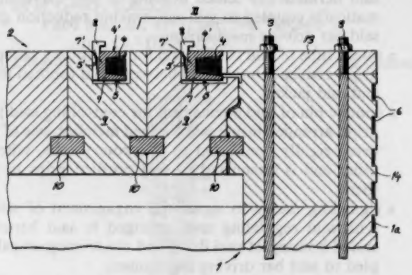
said filter element being suspended from said filter casing cover such that the removal of said filter casing cover and said filter element occur together leaving said filter casing in position.

4,124,447

PRESSURE VESSEL FOR NUCLEAR REACTOR

Heiko Gross, Krefeld, Germany, assignor to Siempelkamp Giesserei KG, Krefeld, Germany

Continuation-in-part of Ser. No. 638,075, Dec. 5, 1975, Pat. No. 4,057,162. This application Dec. 13, 1976, Ser. No. 749,757
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1974, 2457661; France, Oct. 28, 1975, 75 32869
Int. Cl.² G21C *13/04*
U.S. Cl. 176—87 **7 Claims**



1. A pressurizable vessel for a nuclear reactor, comprising a cylindrical shell and a cover mounted on said shell, said cover comprising a multiplicity of sections forming a generally flat disk and formed, at an upper side thereof, with at least one annular abutment and an annular prestressing arrangement with respective prestressing cables bearing upon said abutment, said disk being generally circular and planar and having a central array of bodies, a transition array of bodies surrounding said central array, a further array of bodies surrounding said transition array and an outer array of bodies surrounding said further array, at least one of said arrays of bodies being urged inwardly against a more inwardly array by said prestressing arrangement, adjacent ones of said bodies being formed with mutually interfitting means parallel to the plane of said disk for taking up forces transverse to the plane of the disk.

4,124,448

PROCESS FOR THE LARGE SCALE PRODUCTION OF HUMAN GROWTH HORMONE BY SERIAL SECONDARY SUSPENSION CULTURE

Mandayam J. Narasimhan, Bangalore, India, and John A. Anderson, St. Paul, Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

Filed Apr. 9, 1976, Ser. No. 675,643
Int. Cl.² C12B *3/00*; C12K *9/00*
U.S. Cl. 195—1.8 **13 Claims**

1. A nutrient culture medium composition adapted to the production of growth hormone from pituitary cells by serial subculturing, said composition consisting essentially of effective amounts of an amino acid-rich nutrient medium supplemented by the addition of minor amounts of liver extract, insulin, and anti-biotic and anti-fungal agents.

4,124,449

METHOD AND APPARATUS FOR BACTERIAL MICROSCOPY

Kent S. Barta, 721 Olive St., St. Louis, Mo. 63101, and Jerome A. Gross, 6304 S. Rosebury, Clayton, Mo. 63105

Filed Feb. 7, 1977, Ser. No. 765,938
Int. Cl.² C12K *1/10*
U.S. Cl. 195—139 **8 Claims**

1. An apparatus for use in microscopic examination of bacteria, comprising

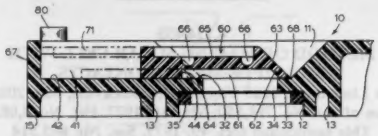
a microscope slide with a bore having mounted therein

a filter mount entirely bounded by a frame part,

a flat filter membrane having a surface which retains thereon

all bacteria to be examined, mounted in said frame part without extending above the upper surface thereof, and

a slidable inverted delivery chamber mounted sideward adjacent to said filter membrane and having a lower edge presented against the upper surface of said frame part upon the delivery chamber being slided sideward over



said filter membrane, said delivery chamber being adapted to deliver a liquid to said membrane,

whereby bacteria retained on the surface of said filter membrane may be treated by a liquid delivered thereon by said delivery chamber and may thereafter be examined by microscopy.

4,124,450

METHOD FOR PRODUCING COKE

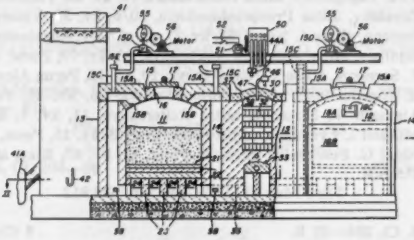
James E. MacDonald, Latrobe, Pa., assignor to Pennsylvania Coke Technology, Inc., Greensburg, Pa.

Continuation-in-part of Ser. No. 634,602, Nov. 24, 1975, Pat. No. 4,045,299. This application Apr. 18, 1977, Ser. No. 788,284

The portion of the term of this patent subsequent to May 24, 1994, has been disclaimed.

Int. Cl.[2] C10B *9/00*

U.S. Cl. 201—15 **17 Claims**



1. A method for producing coke in a non-recovery type coke oven chamber including side walls and a floor comprising the steps of:

charging and leveling a coal charge in the oven chamber leaving a space about the coal charge,

controllably decreasing a supply of primary air fed into the coking chamber throughout a coking period to minimize consumption of the coal charge while essentially maintaining the liberation of heat by the combustion of volatile distillate products to cause coking to proceed from the top of the coal charge downwardly,

withdrawing the effluent into a plurality of downcomers within the side walls of the coking chamber from the space above the coal charge in the coking chamber,

admixing a controlled amount of heated secondary air for combustion of the effluent in each downcomer to maintain a temperature therein within the range of 1200° F. to 2400° F. to cause coking to proceed from the sides of the coal charge,

discharging the effluent from the downcomers into a sole heating flue beneath the floor of the coking chamber having flue spaces wherein further combustion of the effluent maintains a sole flue temperature within the range of 1800° F. to 2700° F. to cause coking to proceed from the bottom of the coal charge upwardly,

conducting the effluent from the sole heating flue into a checker-filled ignition chamber,

maintaining a temperature of between 1600° F. and 2200° F. in the ignition chamber to incinerate the effluent,

withdrawing the incinerated gases from the checker-filled ignition chamber under a negative draft pressure, and

maintaining said negative draft pressure between 0.15 and 0.17 inch water gage during the coking process.

4,124,451

CLOSURE FOR A COKING CHAMBER OF A COKING OVEN

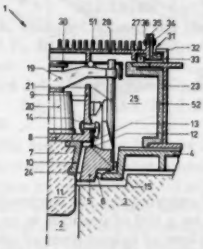
Kurt Dix, and Werner Hoffmann, both of Bochum, Fed. Rep. of Germany, assignors to G. Wolff Jr. Kommanditgesellschaft, Bochum-Linden, Fed. Rep. of Germany

Filed Jul. 19, 1976, Ser. No. 706,839

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1975, 2532097

Int. Cl.[2] C10B *25/06*

U.S. Cl. 202—248 **14 Claims**



1. A door assembly for a coking chamber having a door opening situated in a wall of the chamber and surrounded by an annular frame, said assembly comprising:

a door body dimensioned to cover said opening;

an annular metallic sealing strip on said body engageable with said frame all around said opening;

closing means for urging said body toward said chamber and said strip into snug engagement with said frame, whereby gas is substantially prevented from escaping from said chamber between said frame and said strip;

an outer door; and

means including an elastically compressible seal and an annular wall between said outer door and said wall and surrounding said door body for forming with said outer door, said door body, said frame, and said wall a substantially closed and gastight lock chamber for retaining any gas which has escaped past said metallic sealing strip from said chamber.

4,124,452

DISTILLATION TECHNIQUE FOR REMOVAL OF UDMH FROM WATER

Larry D. Henderson, Bryans Road, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 22, 1978, Ser. No. 908,321

Int. Cl.[2] B01D *3/40*; C07C *85/26, 87/24*

U.S. Cl. 203—56 **6 Claims**

1. A process for extracting essentially pure unsymmetrical dimethyl hydrazine from a solution containing unsymmetrical dimethyl hydrazine, water, and other volatiles and non-volatiles, comprises:

charging a stillpot with a solution containing unsymmetrical dimethylhydrazine, water, and other volatiles and non-volatiles;

mixing into said solution sufficient caustic sodium hydroxide to cause said solution to separate into a two layer system;

mixing into said two layer system a distillation agent selected from the group consisting of hexane, ethanol and isopropanol, in an amount ranging from about 1 to about 5 weight percent of said solution; and

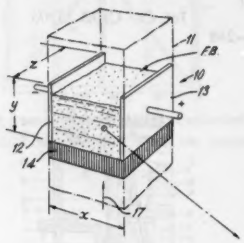
distilling said two layer system so as to generate an essentially pure unsymmetrical dimethyl hydrazine distillate.

4,124,453

ELECTROCHEMICAL PROCESSES

Martin Fleischmann, Eastleigh; Francis Goodridge, and Christopher J. H. King, both of Newcastle-upon-Tyne, all of England, assignors to National Research Development Corporation, London, England

Filed Sep. 29, 1975, Ser. No. 617,489
Int. Cl.[2] B01K *1/00*
U.S. Cl. 204—1 R **13 Claims**



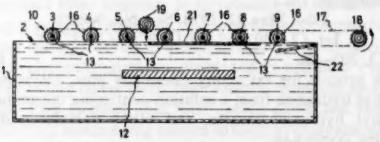
1. A method of carrying out an electrochemical reaction comprising setting up a bed of particles in an electrochemical cell, the surfaces at least of at least some of said particles being at least semi-conductive, passing liquid consisting of at least one of the grup consisting of electrolyte liquid, liquid reactant, electrolyte liquid with gases entrained therewith, and liquid reactants with gases entrained therewith, upwards through said bed of particles to form a fluidised bed of particles and applying a voltage gradient across at least a portion of said fluidised bed of particles, the size of particles, the conductivity of and rate of flow of said at least one liquid and the voltage gradient being such that not only are anodic and cathodic faces established in respect of each of at least some of said particles of the fluidised bed but the electropotentials on said faces on substantially each bipolar particle are such that said electrochemical reaction takes place on at least some of said bipolar particles but only on one portion of the surface thereon of said particles.

4,124,454

ELECTROLYTIC TREATMENT OF METAL SHEET

Wai K. Shang, 501 Wellington House 3A Wyndham St., Hong Kong, Hong Kong

Filed Sep. 6, 1977, Ser. No. 830,686
Claims priority, application United Kingdom, Oct. 4, 1976, 41114/76
Int. Cl.[2] C25D *7/00, 17/06*
U.S. Cl. 204—27 **17 Claims**



12. A method of electrolytically treating a ferromagnetic metal sheet, comprising the steps of transporting the sheet across the surface of a bath of electrolyte by means of a conveyor comprising a series of rollers, rotating said rollers and producing a magnetic field in each roller which field is directed to the exterior of the roller so that the sheet is held against the underside of the conveyor by the resulting magnetic force acting on the sheet, and positioning the rollers so that only the lower surface of the sheet is in contact with the electrolyte.

4,124,455

METHOD OF MAKING SOLAR CELL WITH MULTIPLE-METAL CONTACTS

Joseph Lindmayer, 1335 Piccard Dr., Rockville, Md. 20850

Division of Ser. No. 795,550, May 10, 1977, Pat. No. 4,082,568. This application Oct. 19, 1977, Ser. No. 843,514
Int. Cl.[2] C25D *5/00*; H01L *31/18*
U.S. Cl. 204—38 B **5 Claims**

1. A method of forming a contact adhered to a solar cell composed of a semiconductor material, comprising vapor depositing a first layer of a titanium group element wherein said titanium group element is titanium, chromium, molybdenum, or tantalum on said material, vapor depositing on said first layer a second layer comprising a mixture of said titanium group element and an element selected from the platinum group wherein said platinum group element is palladium or platinum, vapor depositing on said second layer a third layer consisting essentially of an element from the platinum group wherein said platinum group element is palladium or platinum, and depositing a body of contact metal on said third layer.

4,124,456

METHOD OF TRIS(PERFLUOROALKYL)PHOSPHINE OXIDES

Lev M. Yagupolsky, ulitsa Ivana Kudri, 41, kv. 48; Vladimir N. Zavatsky, ulitsa Preobrazhenskaya, 20/6, kv. 39; Valery Y. Semeny, ulitsa A. Navoi, 57, kv. 27, all of Kiev; Konstantin N. Bildinov, ulitsa Admirala Nakhimova, 26, kv. 79, Perm; Petr V. Serebrov, ulitsa Voronezhskaya, 20, kv. 22, Perm; Alevtina A. Goncharenko, ulitsa Voronezhskaya, 20, kv. 25, Perm; Alexandr V. Kirsanov, ulitsa Reiterskaya, 11, kv. 7, Kiev; Mikhail I. Lyapunov, ulitsa Fedoseeva, 13, kv. 15, Perm, and Ninel G. Feschenko, ulitsa E. Potie, 11, kv. 67, Kiev, all of U.S.S.R.

Filed May 21, 1976, Ser. No. 688,912
Int. Cl.[2] C25B *3/04*
U.S. Cl. 204—59 R **5 Claims**

1. A method of preparing a tris(perfluoroalkyl) phosphine oxide having the formula

wherein R_F is a perfluoroalkyl of normal or iso-structure having from 2 to 4 carbon atoms comprising electrochemically fluorinating a trialkylphosphine oxide having the formula R_3PO, where R is a C_2–C_4 alkyl and subsequently isolating the fluorinated product.

4,124,457

PRODUCTION OF METALLIC LEAD

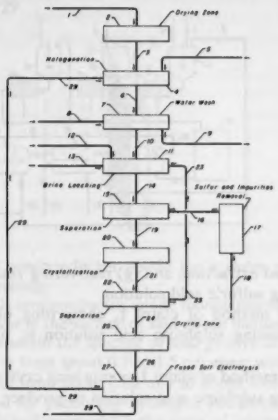
John C. Stauter, Streamwood, Ill., and Richard T. Um, Tucson, Ariz., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 688,452, May 20, 1976, abandoned. This application Sep. 16, 1977, Ser. No. 833,847
Int. Cl.[2] C25C *3/34*
U.S. Cl. 204—66 **13 Claims**

1. In a process for the production of metallic lead which comprises the steps of:

(a) drying a lead sulfide source containing at least one metal

impurity selected from the group consisting of iron, copper, zinc, and cadmium;
(b) halogenating the dried lead sulfide source at a temperature in the range of from about 90° to about 120° C.;
(c) leaching the halogenated mixture with brine;
(d) filtering the resulting brine solution to separate elemental sulfur and residue from soluble lead halide;



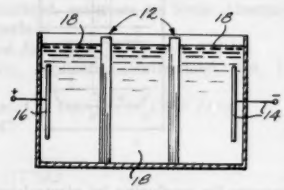
(e) crystallizing said lead halide; and
(f) recovering metallic lead by electrolysis, the improvement which comprises water washing the halogenated mixture prior to the brine leaching to remove the small amount of soluble halides of the metal impurity.

4,124,458

MASS-TRANSFER MEMBRANE AND PROCESSES USING SAME

Karl Moeglich, Dunedin, Fla., assignor to Innova, Inc., Clearwater, Fla.

Filed Jul. 11, 1977, Ser. No. 814,715
Int. Cl.² C25B *13/04*; C25C *7/04*
U.S. Cl. 204—98 **27 Claims**



1. In an electrochemical process wherein ions in one body of liquid pass through an operative portion of an ion-permeable membrane assembly into another body of liquid, the improvement which comprises using an ion-permeable membrane assembly which comprises
(a) a film of electrically insulating material, wherein said film is substantially impermeable to water, is substantially ion-impermeable and has a thickness of 1 micron to 1 millimeter;
(b) and at least one layer of porous material disposed on at least one surface of said film wherein the layer of porous material has a thickness which ranges from 0.01 to 1.0 millimeters, and wherein the thickness of said layer is greater than the average pore size of the pores of said porous material and wherein the material of said porous layer is incapable of acting as an electrode,
wherein each of said film and said porous material is substantially chemically inert under the conditions existing in the cell.

18. A membrane assembly, which divides an electrochemical cell into at least two compartments comprising
(a) a film of substantially electrically insulating material, wherein said film is substantially impermeable to water, is substantially ion-impermeable and has a thickness of 1 micron to 1 millimeter;
(b) and at least one layer of porous material disposed on at least one surface of said film, wherein said layer of porous material has a thickness which ranges from 0.01 to 1.0 millimeters, and wherein the thickness of said layer is greater than the average pore size of the pores of said porous material and wherein the material of said porous layer is incapable of acting as an electrode,
wherein each of said film and said porous material is substantially chemically inert under the conditions existing in the cell.

4,124,459

PROCESS FOR REMOVING MERCURY FROM BRINE SLUDGES

Julian E. Blanch, Stamford, Conn., and Helmut W. Majewski, New York, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jul. 21, 1977, Ser. No. 817,763
Int. Cl.² C25B *1/26, 1/36*
U.S. Cl. 204—99 **19 Claims**

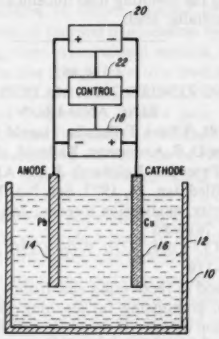
1. A process for reducing the mercury content of mercury cathode brine electrolysis cell sludge containing minor concentrations of mercury by sequentially: (1) acidifying said sludge to a pH below 2.5, and (2) leaching said sludge with aqueous hypochlorite solvent of a pH above 5 until the mercury content is less than 0.75 part per million by weight based on the weight of sludge wet cake after leaching.

4,124,460

ELECTROWINNING OF COPPER IN PRESENCE OF HIGH CONCENTRATION OF IRON

Raouf O. Loutfy, Pierrefonds, and Nanabhai R. Bharucha, Beaconsfield, both of Canada, assignors to Noranda Mines Limited, Toronto, Canada

Filed Nov. 9, 1977, Ser. No. 849,881
Int. Cl.² C25C *1/12*
U.S. Cl. 204—108 **15 Claims**



1. A process for electrowinning copper from leached solutions containing a high iron concentration in the range of about 5 to 40 gpl by electrodeposition of copper in an electrochemical cell provided with a cathode and an insoluble anode, which comprises applying direct current through the solution in the cell between said cathode and insoluble anode and periodically reversing the polarity of said current to obtain, during electrolysis, a low ferric ion concentration in the solution, thereby

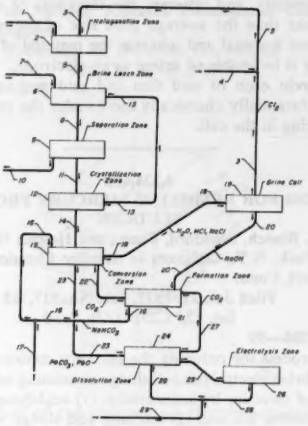
increasing the operating current efficiency and consequently decreasing the power consumption for metal deposition.

4,124,461

PRODUCTION OF METALLIC LEAD

John C. Stauter, Streamwood, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Mar. 3, 1978, Ser. No. 883,114
Int. Cl.[2] C25C *1/18*
U.S. Cl. 204—117 **9 Claims**



1. In a process for the production of lead from a lead bearing source which comprises the steps of:
(a) subjecting said lead bearing source to an activation or drying treatment;
(b) halogenating the treated lead bearing source;
(c) leaching the halogenated lead bearing source with brine;
(d) filtering the leached solution to separate gangue from soluble lead halide;
(e) crystallizing said lead halide; and
(f) recovering metallic lead, the improvement which comprises converting said crystallized lead halide to lead carbonate by treatment with sodium bicarbonate, solubilizing said lead carbonate in hydrofluosilicic acid and subjecting the resulting lead fluosilicate to electrowinning to form metallic lead.

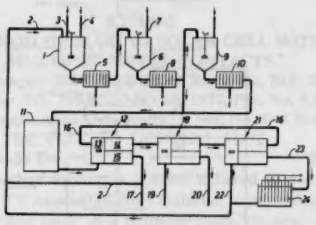
4,124,462

RECOVERING ZINC FROM A MATERIAL CONTAINING ZINC AND IRON

Hans Reinhardt, Västra Frölunda; Harald D. Ottertun, Mölndal, and Sven O. S. Andersson, Kållered, all of Sweden, assignors to MX-Processer Reinhardt & Co. AB, Molndal, Sweden

Filed Jan. 26, 1977, Ser. No. 762,561
Claims priority, application Sweden, Jan. 26, 1976, 7600791; Sep. 26, 1976, 7610685
Int. Cl.[2] C01G *3/10, 9/06*; C25C *1/12, 1/16*
U.S. Cl. 204—119 **7 Claims**

1. The method of recovering zinc from a material containing zinc and iron, comprising (a) leaching the material with an aqueous solution of sulfuric acid, the sulfuric acid being added in a quantity to produce a pH of from about 3 to about 5.5 in the final stage of the leaching process, so as to dissolve the zinc but not the iron contained in the material, (b) adding zinc powder to the leaching solution thus obtained, in order to reduce the content of metallic impurities in the leaching solution, (c) extracting zinc from the aqueous solution thus obtained by contacting it, in a liquid-liquid extraction process, with a solution of a dialkyl phosphoric acid in an organic solvent, (d) returning the aqueous raffinate leaving the extraction process to renewed leaching, (e) re-extracting zinc from the organic solution by contacting it, in a liquid-liquid extraction process, with an aqueous solution containing from about 40 to about 600 grams per liter of sulfuric acid in such quantity that the sulfuric acid solution leaving the re-extraction process contains from about 60 to about 150 grams per liter of zinc, (f) returning the organic solution leaving the re-extraction process



to renewed extraction, and (g) recovering zinc from the zinc-containing sulfuric acid solution.

2. The method of claim 1, comprising electrolyzing the zinc-containing sulphuric acid solution to produce metallic zinc.

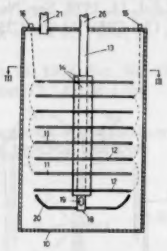
3. The method of claim 1, comprising crystallizing the zinc-containing sulphuric acid solution to produce zinc sulphate.

4,124,463

ELECTROLYTIC CELL

Archie H. Blue, Christchurch, New Zealand, assignor to Ross Derisley Wood; Roland Edgar; Alec Henry Taylor, all of St. Martin's Guernsey, Channel Islands and Margaret Elizabeth Pyke, Essex, England

Filed Dec. 29, 1976, Ser. No. 755,608
Int. Cl.[2] C25B *1/02, 9/00, 9/02*
U.S. Cl. 204—129 **5 Claims**



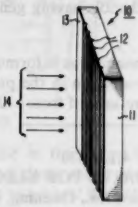
1. A process for producing by electrolysis of an aqueous liquid a combustible mixture of hydrogen and oxygen, comprising: electrolyzing the aqueous liquid into hydrogen and oxygen in an electrolytic cell having a gas-tight casing, a substantially central tubular post mounted in the casing and having an air inlet at its upper end, and a plurality of electrodes supported on the post and axially spaced therealong, alternate electrodes being connected to a first electrical terminal and to a second electrical terminal respectively connected to a respective poles of a current source and being mutually insulated, the post having an air outlet below the electrodes out of which flows air from the air inlet into the cell and over the electrodes; and a source of air under pressure connected to the said air inlet forcing a flow of air through the aqueous liquid contained in the cell in operation thereof; the cell having in its upper region a common outlet exhausting the combustible mixture comprising air forced through the cell and hydrogen produced by electrolysis of said liquid in said cell.

4,124,464

GROOVED N-TYPE TiO_2 SEMICONDUCTOR ANODE FOR A WATER PHOTOLYSIS APPARATUS

Kazuo Miyatani, Tokyo, and Isao Sato, Kodaira, both of Japan, assignors to RCA Corporation, New York, N.Y.

Filed Oct. 19, 1977, Ser. No. 843,700
Int. Cl.[2] C25B 1/02, 9/00, 11/02
U.S. Cl. 204—129 17 Claims



1. An n-type semiconductor anode for a water photolysis apparatus comprising:

an n-type TiO_2 semiconductor anode having one or a plurality of grooves in the surface of said anode incident to solar radiation wherein the spacing of said groove or plurality of grooves is from about 0.5 to 1.5 cm apart with a width and depth of from about 0.02 mm to about 0.08 mm.

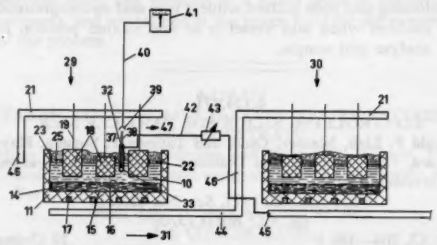
7. In a method for producing hydrogen and oxygen from a water photolysis cell, comprising the steps of irradiating with solar radiation an n-type TiO_2 semiconductor anode immersed in an electrolyte solution to produce oxygen gas and the generation of an electrical current, electrically connecting said n-type semiconductor anode to a cathode in said electrolyte solution, thereby producing hydrogen gas at said cathode, wherein the improvement comprises forming one or a plurality of grooves in the radiation incident surface of said n-type TiO_2 semiconductor anode to provide activation centers for increasing the evolution of oxygen gas, minimizing the reflection losses of solar radiation on said n-type semiconductor anode, and increasing the current at the cathode for more efficient evolution of hydrogen.

4,124,465

PROTECTING TUBE

Wolfgang Schmidt-Hatting, and Ulrich Heinzmann, both of Chippis, Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Jun. 28, 1973, Ser. No. 374,461
Claims priority, application Switzerland, Jul. 18, 1972, 10748/72
Int. Cl.[2] C25C 3/06; C23F 13/00
U.S. Cl. 204—147 2 Claims



1. A method for protection of pieces to be inserted into an operating fluoride melt electrolysis cell normally used for recovery of aluminum from aluminum oxide, wherein direct current is flowing through the fluoride melt between an anode and a cathode, as is normally used for recovery of aluminum from aluminum oxide, the insertion of said pieces into the operating cell being for special purposes such as for use as a sheathing for measuring devices, said pieces being made of an electrically conductive material which is resistant against reaction with melted fluoride and melted aluminum but not resistant against reaction with oxygen, especially the oxygen which forms in the operating cell on a portion of the piece in contact with the melt due to differences in potential that form across said piece when inserted into an operating cell; comprising the steps of

applying an electrical potential between said piece and said cell, said potential being of such magnitude and polarity as to prevent direct current from emerging from said piece at any place within the melt and

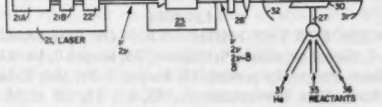
maintaining, substantially, said electrical potential.

4,124,466

ENHANCING CHEMICAL REACTIONS

John R. Morrey, Richland, Wash., assignor to Battelle Memorial Institute, Columbus, Ohio

Continuation-in-part of Ser. No. 307,380, Nov. 17, 1972, abandoned. This application Jun. 18, 1974, Ser. No. 480,411
Int. Cl.[2] B01J 1/10
U.S. Cl. 204—157.1 R 4 Claims



1. A method of enhancing a selected chemical reaction that comprises increasing the population of a selected high vibrational energy state of a reactant molecule substantially above its population at thermal equilibrium by directing onto the molecule a beam of radiant energy from a laser having a combination of frequency and intensity selected to pump the selected energy state, and carrying out the reaction with the temperature, pressure, and concentrations of reactants maintained at a combination of values selected to optimize the reaction in preference to thermal degradation by transforming the absorbed energy into translational motion, wherein photons are excited from one energy level to a level above the next higher energy level by providing radiant energy having a plurality of selected frequencies from a laser that is tuned rapidly from one selected frequency to another.

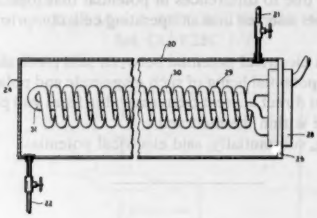
4. A method for enhancing the reaction of HCl with NO to yield the HNO dimer that comprises increasing the population of a selected high vibrational energy state of a reactant molecule substantially above its population at thermal equilibrium by directing onto the molecule a beam of radiant energy having a combination of frequency and intensity selected to pump the selected energy state, and carrying out the reaction with the temperature, pressure, and concentrations of reactants maintained at a combination of values selected to optimize the reaction in preference to thermal degradation by transforming the absorbed energy into translational motion, wherein a neodymium doped yttria garnet laser provides the radiant energy at a frequency of about 10565 cm^{-1}, the radiation frequency is doubled to about 21130 cm^{-1}, the doubled frequency radiant energy is passed through a crystal of lithium niobate at a temperature of about 350° C and oriented to emit radiant energy at frequencies of about 2924 cm^{-1} and 18206 cm^{-1}, and the radiant energy at about 10565 cm^{-1} and 2924 cm^{-1} is directed to the reactants.

4,124,467

METHOD AND APPARATUS FOR PRODUCING OZONE

Andrew J. Pincon, 331 Wallace Rd., Marietta, Ga. 30060

Filed Dec. 30, 1975, Ser. No. 645,363
Int. Cl.[2] B01J *1/10;* B01K *1/00*
U.S. Cl. 204—157.1 R 7 Claims



1. Apparatus for producing ozone, comprising a casing, an inlet for introducing oxygen into said casing, an outlet for discharging ozone from said casing, at least one lamp within said casing, said lamp comprising a tube filled with a gas and means for passing an electric current through said gas, said tube being transparent to a selected wavelength of radiant energy, said selected wavelength of radiant energy being produced by said gas, and said gas being selected from the group consisting of deuterium, and mixtures of deuterium and xenon.

4,124,468

PROCESS FOR THE PRODUCTION OF POLYAMIDES

Vasily I. Serenkov, ulitsa Plekhanova, 35, korpus 7, kv. 23; Jury S. Deev, Fergansky proezd, 10, korpus 2, kv. 104; Evgeny A. Ryabov, ulitsa Pervomaiskaya, 43, kv. 31, all of Moscow; Elena V. Gorbunova, Noginsky raion, poselok Obukhovo, ulitsa Lenina, 5, kv. 10; Vladimir S. Tikhomirov, Schelkovo, ulitsa Kooperativnaya, 23, kv. 5, both of Moskovskaya oblast; Marina K. Dobrokhotova, Dubininskaya ulitsa, 6, kv. 93, and Alexandr V. Berezovsky, ulitsa Plekhanova, 24, korpus 1, kv. 48, both of Moscow, all of U.S.S.R.

Filed Dec. 8, 1975, Ser. No. 638,688
Int. Cl.[2] C08F *2/54, 4/00;* C08G *69/14*
U.S. Cl. 204—159.11 20 Claims

1. A process for the production of polyamides, which consists essentially of cationical polymerizing lactams having 6 to 12 carbon atoms in the presence of a transition d-metal oxide selected from the group consisting of TiO_2, V_2O_5, Cr_2O_3, MnO_2, CuO, Cu_2O, ZnO, Co_2O_3, MoO_3 and WO_3 as catalyst, said catalyst accounting for from 0.1 to 50 percent by weight of the reaction mixture consisting of the lactam and the oxide at a temperature in the range from 200° to 350° C. in an atmosphere of air or an inert gas.

13. A process as claimed in claim 1, in which the polymerization of the lactam is effected with the reactants being simultaneously exposed to an ionizing radiation.

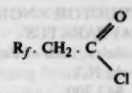
4,124,469

PERFLUOROALKYLACETYL CHLORIDE PROCESS

Heinrich Bathelt, Altötting, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 751,013, Dec. 16, 1976, abandoned. This application Oct. 31, 1977, Ser. No. 846,709
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1975, 2558711; Dec. 24, 1975, 2558728
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—163 R 1 Claim

1. A process for the manufacture of perfluoroalkylacetyl chlorides having general formula



I.

wherein R_f represents a straight-chain or branched perfluoroalkyl radical having from 2 to 12 carbon atoms, which comprises reacting perfluoroalkyl ethanols having general formula

$$R_f \cdot CH_2 \cdot CH_2 \cdot OH \qquad \text{II.}$$

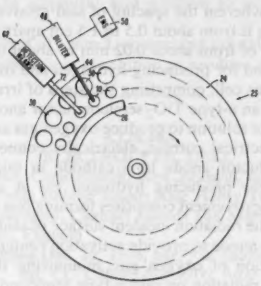
wherein R_f has the same meaning as in formula I, with chlorine under exposure to UV irradiation in the presence of an inert organic solvent, at temperatures of from −20° C. to +120° C.

4,124,470

METHOD AND APPARATUS FOR ELECTROPHORESIS

Harald Dahms, 22 Lakeview Rd., Ossining, N.Y. 10562

Continuation of Ser. No. 465,475, Apr. 30, 1974, abandoned. This application Jun. 21, 1976, Ser. No. 697,874
Int. Cl.[2] G01N *27/26, 33/16*
U.S. Cl. 204—180 R 43 Claims



1. A method for analyzing a sample by zone electrophoresis, comprising the steps of:

moving a vessel by a conveyor means to a first position,

filling said vessel at said first position with said sample to be analyzed and with an electrophoretic medium,

moving said vessel to a second position,

passing an electrolytic current through said vessel, said sample, and said medium at a time when said vessel has moved from said first position toward said second position to establish in said medium an electrophoretic zone pattern comprised of separated thin layers of constituents of said sample,

detecting said zone pattern while it is in said electrophoretic medium when said vessel is at said second position to analyze said sample.

4,124,471

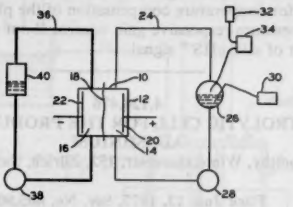
CONTROLLING SILICA SOL PARTICLE SIZE

Donald F. Lieb, Mentor, Ohio, and Thomas T. Sugano, Hayward, Calif., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Aug. 22, 1977, Ser. No. 826,511
Int. Cl.[2] B01D *13/02*
U.S. Cl. 204—180 P 10 Claims

1. A process for controlling electrodialytically produced silica sol particle size within the range of 10 to 50 millimicrons and the concentration to within about 5 to about 50 weight percent comprising: providing an anolyte having a plurality of glass beads which are fluidized and impinge on the anode so as to substantially prevent the deposition of silica thereon; effecting electrodialysis of an alkali metal silicate anolyte in an electrodialysis cell with a cation permselective membrane separt-

ing the anolyte and the catholyte; adding alkali metal silicate solution to the anolyte to maintain the pH within the range of from about 7.5 to about 8.5 whereby a silica sol with increasing particle size is formed; and when the silica sol has reached the



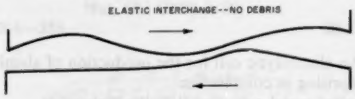
desired particle size in the range of 10 to 50 millimicrons, continuing electrodialysis with addition of an alkali metal hydroxide solution to control the pH until the silica sol has the desired concentration within the range of about 5 to about 50 weight percent.

4,124,472

PROCESS FOR THE PROTECTION OF WEAR SURFACES

Richard P. Riegert, 701 E. Victoria St., Santa Barbara, Calif. 93103

Filed Feb. 28, 1977, Ser. No. 772,515
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—192 EC **4 Claims**



1. A process for providing a tribological surface which comprises depositing a film of a selected material on a substrate of softer material by cathode sputtering, the film having a thickness such that the film is fully elastically compliant and remains intact in the presence of plastic deformation of the substrate meterial, and such that impact energy is transmitted through the film to the substrate to be absorbed entirely by the substrate, and which includes the step of biasing the tribological surface negatively with respect to the cathode sputtering source to an extent sufficient to cause ionized species of the sputtered material to be accelerated onto the tribological surface so as to inhibit any tendency for the film to crystallize, and so as to cause the film to be intimately bonded to the substrate, the improvement wherein the negative bias is initiated at a selected level, and reduced to a lower level as the process proceeds, and maintained at the lower level for the remainder of the process.

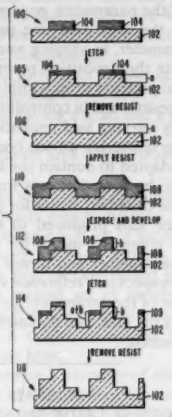
4,124,473

FABRICATION OF MULTI-LEVEL RELIEF PATTERNS IN A SUBSTRATE

Hans W. Lehmann, Hedingen, and Roland W. Widmer, Rümland, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed Jun. 17, 1977, Ser. No. 807,482
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—192 E **2 Claims**

1. In the method of making a multi-level straight walled square wave diffration grating having a periodicity of less than 5 microns on the surface of a substrate which comprises:
coating said substrate with a photoresist,
exposing said photoresist through a mask and developing said photoresist so as to provide a first surface relief pattern,
etching said pattern into said substrate to a first depth corresponding to a predetermined primary color,
recoating said etched substrate with photoresist,
exposing said photoresist through a mask and developing said photoresist so as to provide a superposed second surface relief pattern, and
etching said pattern into said substrate to a second depth corresponding to another predetermined primary color,



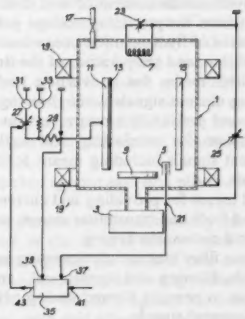
the improvement which comprises carrying out said etching steps by sputter etching at a rate of about 200–400 angstroms per minute in the presence of a reactive gas at a pressure of from 2–20 millitorr, which gas has the formula CX_nF_{4-n} wherein X is hydrogen or chlorine and n is an integer from 0–4 which forms volatile byproducts with the sputtered material and
removing said byproducts.

4,124,474

METHOD AND APPARATUS FOR CONTROLLING THE DEPOSITION OF FILMS BY REACTIVE SPUTTERING

Guillermo Bomchil, Seyssinet; François Buiguez, Pau; Sylvie Galzin, Chambery; Alain Monfret, Meudon, and Louise Peccoud, Claix, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 3, 1977, Ser. No. 848,133
Claims priority, application France, Nov. 15, 1976, 76 34840
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—192 R **10 Claims**



1. A method for controlling the deposition on a substrate of thin film layers comprising a compound formed of a chemical substance C and a reactive gas, which consists in placing

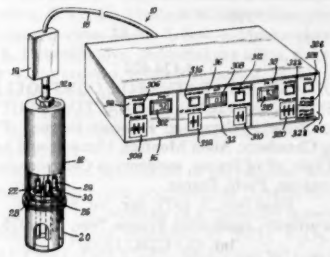
within a chamber said substrate, a gas mixture containing said reactive gas and a target containing said substance C, the flow rate and the proportion of gases in the gas mixture being constant, producing a gas plasma containing ions and applying an electric field to said ions which are thus caused to bombard said target and to sputter said substance C so that the sputtered particles of substance C combine with said reactive gas so as to form said compound, wherein said method further consists in establishing all the bombardment parameters with the exception of one of the parameters governing the bombardment of the target by the ions, said one parameter being termed a regulation parameter, in varying said regulation parameter in order to initiate the deposition process, in measuring at each instant the total pressure drop within the chamber with respect to the initial pressure and in controlling said total pressure drop by controllably varying said regulation parameter.

9. A vacuum sputtering device comprising a vacuum chamber which is adapted to contain the target to be sputtered and the substrate to be coated, means for introducing a given gas mixture into the chamber, means for producing ions, means for accelerating the ions produced to said target, wherein said device further comprises means for measuring the total pressure within the chamber and means for controlling said total pressure with respect to a reference value signal by controlling variation of one of the parameters governing the bombardment of the target by the ions, said parameter being designated as the regulation parameter.

4,124,475
HYDROGEN SULFIDE MONITORING SYSTEM

Mark S. Zetter, Santa Clara, and Eric S. Micko, Los Altos Hills, both of Calif., assignors to Delphian Corporation, Los Altos, Calif.

Filed Aug. 30, 1977, Ser. No. 829,046
Int. Cl.[2] G01N *27/56*
U.S. Cl. 204—195 R **2 Claims**



1. Apparatus for monitoring hydrogen sulfide hazard potential and hydrosulfide content of well drilling mud, comprising

sensor means for providing voltage potential signals representative of hydrogen ion concentration, sulfide ion concentration, and temperature of the drilling mud,

transmitter means for converting said voltage signals to analog current signals while drawing a constant bias current, and producing a return current signal,

cable means for conducting said analog, bias and return current signals including means for filtering said analog signals, and

control means for providing said current and current signals to and from said transmitter means, said power supply and control means comprising

translator filter means for converting said signals to voltage signals, filtering said signals, and converting said voltage signals to provide filtered analog pH, $pS^{=}$ and temperature current signals,

means for combining said pH and $pS^{=}$ signals to provide a hazard potential signal pHP representative of H_2S gas potentially at equilibrium with the mud,

means for combining said pH and $pS^{=}$ signals to provide a pHS^{-} signal representative of hydrosulfide ion concentration of the mud,

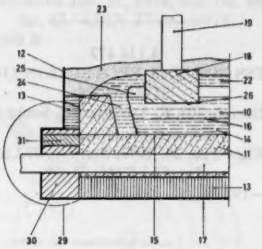
means for temperature compensation of the pHP signal by temperature responsive gain control about the isoelectric point of said pHP signal, and

means for temperature compensation of the pHS^{-} signal by temperature responsive gain control about the isoelectric point of said pHS^{-} signal.

4,124,476
ELECTROLYTIC CELL FOR THE PRODUCTION OF ALUMINIUM

Egon Rapolthy, Winterthurerstr. 152, Zürich, Switzerland (CH-8057)

Filed Jun. 13, 1977, Ser. No. 805,906
Claims priority, application Switzerland, Jun. 16, 1976, 7718/76
Int. Cl.[2] C25C *3/08, 3/06*
U.S. Cl. 204—243 R **11 Claims**



1. An electrolytic cell for the production of aluminum, comprising in combination:

a walled metal container defining a chamber,

a carbon lining disposed within the container, and including a floor having an upper surface, and being normally susceptible to bulging and cracking during operation of the cell, said chamber accommodating the horizontal expansion of the floor of said container during operation of the cell, and

first and second materials in contact with one another and filling said chamber, the first material extending between said carbon lining and at least one wall of said container and being relatively easily compressible, the second material extending between said carbon lining and at least one wall of said container and being compressible by a load which, while not causing any permanent deformation or cracking of the container, gives rise to a reaction force exerted on the floor of said carbon lining to counteract bulging and cracking of the floor of said carbon lining.

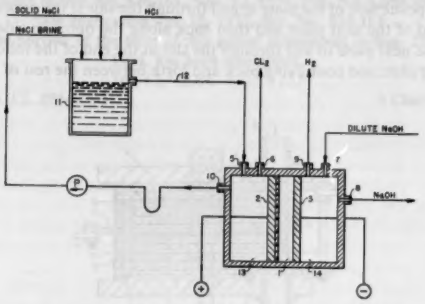
4,124,477
ELECTROLYTIC CELL UTILIZING PRETREATED SEMI-PERMEABLE MEMBRANES

Daniel T. Tokawa, Vancouver; Bernardus J. Mentz; Jeffrey D. Eng, both of North Vancouver, all of Canada; Edward H. Cook, Jr., Lewiston, and Gerald R. Marks, Youngstown, both of N.Y., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Continuation of Ser. No. 574,844, May 5, 1975, abandoned, which is a continuation-in-part of Ser. No. 416,916, Nov. 19, 1973, abandoned. This application Oct. 5, 1976, Ser. No. 729,639
Int. Cl.[2] C25B *13/02, 13/08, 9/00, 1/34*
U.S. Cl. 204—252 **19 Claims**

1. An electrolytic cell which comprises a cell body having an anode compartment containing a porous anode, and a cathode compartment containing a cathode, said compartments being separated from each other by a barrier which is substantially impervious to gases and fluids selected from a sulfonated

perfluorovinyl ether and a sulfostyrenated perfluorinated ethylene propylene polymer, said barrier being pretreated by



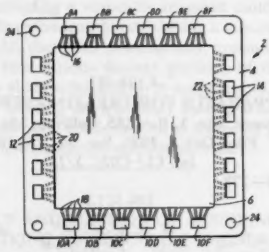
boiling in water for at least one hour, tautly stretched, dried at ambient temperatures and cemented across the front face of the said porous anode.

4,124,478

THIN SHEET APPARATUS AND A FLUID FLOW DEVICE

Hsue C. Tsien, 11 Browning Dr., Livingston, N.J. 07039; Joseph A. Shropshire, 901 St. Marks Ave., Westfield, N.J. 07090, and Agustin F. Venero, 31 Stewart La., Berkeley Heights, N.J. 07922

Filed Feb. 7, 1977, Ser. No. 766,127
Int. Cl.[2] C25B 9/00
U.S. Cl. 204—255 **20 Claims**



1. A thin sheet apparatus having a front and a back, comprising:

a central area and a frame area disposed around said central area;

said central area being made of a fluid impermeable material having substantially planar surfaces;

said frame area containing a first set of supply orifices and oppositely positioned drainage orifices, said first set being located on a first predetermined portion of said frame area, and a second set of supply orifices and oppositely positioned drainage orifices, said second set being located on a different, second predetermined portion of said frame area;

said frame area containing a plurality of channels leading from each of said supply orifices toward said central area and adapted to supply fluid from said supply orifices to the surface of said central area, the plurality of channels leading from each of the first set of supply orifices being located on the front of said frame area, and the plurality of channels leading from each of the second set of supply orifices being located on the back of said frame area;

said frame area containing a plurality of channels leading from said central area toward each of said drainage orifices and adapted to drain fluid from the surface of said central area to said drainage orifices, the plurality of channels leading from each of the first set of drainage orifices being located on the front of said frame area, and the plurality of channels leading from each of the second set of drainage orifices being located on the back of said frame area; and,

said frame area having a total of four sides arranged in a rectangular fashion, wherein said first set of supply orifices and drainage orifices are located on two of said four sides and opposite one another, and said second set of supply orifices and drainage orifices are located on the remaining two of said four sides and opposite one another.

10. A fluid flow device, comprising:

(a) a plurality of stacked groups of elements, each of said groups of elements containing:

(i) a thin sheet apparatus having a front and a back, comprising:

a central area and a frame area disposed around said central area;

said central area being made of a fluid impermeable material having substantially planar surfaces;

said frame area containing a first set of supply orifices and oppositely positioned drainage orifices, said first set being located on a first predetermined portion of said frame area, and a second set of supply orifices and oppositely positioned drainage orifices, said second set being located on a different, second predetermined portion of said frame area;

said frame area containing a plurality of channels leading from each of said supply orifices toward said central area and adapted to supply fluid from said supply orifices to the surface of said central area, the plurality of channels leading from each of the first set of supply orifices being located on the front of said frame area, and the plurality of channels leading from each of the second set of supply orifices being located on the back of said frame area;

said frame area containing a plurality of channels leading from said central area toward each of said drainage orifices and adapted to drain fluid from the surface of said central area to said drainage orifices, the plurality of channels leading from each of the first set of drainage orifices being located on the front of said frame area, and the plurality of channels leading from each of the second set of drainage orifices being located on the back of said frame area; and,

said frame area having a total of four sides arranged in a rectangular fashion, wherein the first set of supply orifices and drainage orifices are located on two of said four sides and opposite one another, and said second set of supply orifices and drainage orifices are located on the remaining two of said four sides and opposite one another;

(ii) a first plastic sheet material substantially the same size and configuration as the central area of said thin sheet apparatus, disposed against the front of said central area, said first plastic sheet material having channels formed on the surface thereof which is against said central area and communicate with said pluralities of channels on the front of said frame area so as to permit fluid flow from said first set of supply orifices over said central area to said first set of drainage orifices;

(iii) a separator, stacked against said first plastic sheet material; and

(iv) a second plastic sheet material substantially the same size and configuration as the central area of said thin sheet apparatus, disposed against the back of said central area, said second plastic sheet material having channels formed on the surface thereof which is against said central area and communicate with said pluralities of channels on the back of said frame area so as to permit fluid flow from said second set of supply orifices over said central area to said second set of drainage orifices; and,

(b) end sheets at opposite ends of said stacked groups of ele-

ments, at least one of said end sheets having sets of orifices so as to permit the flow of a first fluid through said first set of supply orifices and drainage orifices and communicating channels and a second fluid through said second set of supply orifices and drainage orifices and communicating channels; and,

(c) means of securing said stacked groups of elements and end sheets.

4,124,479

BIPOLAR UNIT

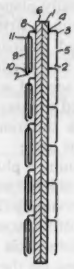
Thomas W. Boulton, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jul. 21, 1977, Ser. No. 817,676

Claims priority, application United Kingdom, Aug. 4, 1976, 32489/76

Int. Cl.[2] C25B *9/00, 11/02, 11/10, 13/08*

U.S. Cl. 204—256 **35 Claims**



1. A bipolar unit for an electrolytic cell comprising

(a) an anode comprising a group of elongated members of a film-forming metal carrying on at least part of their surfaces an electrocatalytically active coating, each of the members being electrically conductively mounted on and projecting from a sheet of a film-forming metal so that a part of the members lies in a plane laterally spaced from the sheet, and

(b) a cathode comprising a group of elongated metal members electrically conductively mounted on and projecting from a metal sheet so that a part of the members lies in a plane laterally spaced from the sheet, each of the elongated members in at least one of the groups being flexible and being mounted independently of the other members in that group, and said one group comprising a plurality of rows and a plurality of columns of said members and the sheets of film-forming anode metal and of cathode metal being electrically conductively bonded to each other.

4,124,480

BIPOLAR CELL

David G. Stevenson, New Town Near Newbury, England, assignor to Paterson Candy International, Limited, London, England

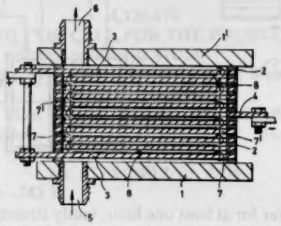
Filed Feb. 14, 1977, Ser. No. 768,097

Claims priority, application United Kingdom, Feb. 17, 1976, 6121/76

Int. Cl.[2] C25B *9/00*

U.S. Cl. 204—268 **4 Claims**

1. In a bipolar cell, a housing having an inlet in one side for liquid electrolyte and an outlet in the opposite side, and a stack of spaced electrode plates in the housing between said inlet and outlet with each plate having two opposite side edges and two ends, said side edges and said ends of each plate being in sealing contact with the housing, each plate having a slot near one end forming a flow edge extending across it spaced inwardly from the adjacent side of the housing, said slot connecting the opposite sides of the plate, and the slots being staggered relative to one another to form with the spaces between the plates a single sinuous electrolyte passage through said stack to thereby cause electrolyte entering said inlet at one side of the nearest plate to flow through the slot at the end of that plate and along the opposite side of the plate to and through the slot at the opposite end of the next plate and then back along the opposite side of said next plate to and through the slot at the end of the following plate and continuing back and forth between the rest of the



plates in the same manner to said outlet, whereby a sinuous flow path through the spaces between adjacent electrode plates is established through the housing extending continuously from its inlet to its outlet so that electrolyte flowing through the housing will sweep out the spaces between the plates to substantially prevent formation of stagnant areas and thus minimize the growth of precipitate between the plates.

4,124,481

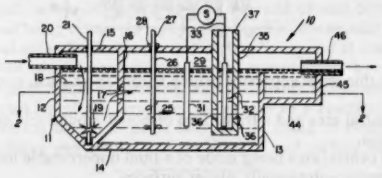
APPARATUS FOR TREATING SEWAGE

James L. Ramer, Rte. 1, Box 155, Sullivan, Mo. 63080

Filed Oct. 6, 1976, Ser. No. 730,104

Int. Cl.[2] C02C *5/12*

U.S. Cl. 204—278 **12 Claims**



1. A sewage treatment plant comprising:

an inlet for delivery of sewage,

comminuting means adjacent the inlet including a compartment and a comminuter,

digestion means adjacent the comminuting means comprising a compartment for the containment of comminuted sewage, bacteria and oxygen,

anode means for supplying oxygen in said digestion means compartment,

a chimney extending through said digestion means compartment to a vent, openings in said chimney to said digestion means compartment, cathode means in said chimney for generating hydrogen together with the generation of oxygen at said anode,

means for supplying electrical energy to said anode and cathode, and

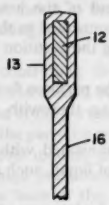
outlet means for treated sewage.

4,124,482

METHOD AND APPARATUS FOR CASTING ANODES

Bill J. Knight, 7315 S. Settler Ave., Tucson, Ariz. 85706

Division of Ser. No. 526,161, Nov. 22, 1974, Pat. No. 4,050,961.
This application Jul. 15, 1977, Ser. No. 816,101
The portion of the term of this patent subsequent to Sep. 27, 1994, has been disclaimed.
Int. Cl.[2] C25C *7/02, 1/12*
U.S. Cl. 204—293 2 Claims



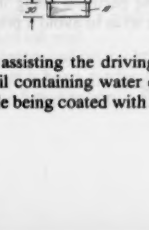
1. An insoluble anode for use in the electrowinning of copper, the anode having a substantially flat configuration with an effective surface area on each side of at least approximately 5 square feet, the anode being formed by a casting process from a lead alloy including approximately 0.01–0.1% by weight calcium, the anode being further characterized by substantially a maximum density and minimum porosity, a uniform precipitate distribution of $PbCa_3$ in a lead matrix, the surface of the anode being continuous or smooth and further characterized as having a galvanized or rolled appearance, said insoluble anode being the product of a process comprising the steps of selecting a lead alloy to include 0.01–0.1% by weight calcium as an alloying agent, heating the lead alloy to a selected molten temperature, providing a vertically arranged mold having an opening along its entire length, establishing a selected temperature for the mold, thereafter continuously streaming the molten lead alloy into various distinct portions of the opening proportionately along substantially its entire length, and subsequently rapidly cooling the lead alloy casting while it is in a substantially unstressed configuration to freeze its grain structure and develop dimensional stability therein.

4,124,483

APPARATUS AND METHOD OF ASSISTING PILE DRIVING BY ELECTRO-OSMOSIS

Lowell B. Christenson, 7410 Thurow, Houston, Tex. 77087

Filed Oct. 13, 1977, Ser. No. 841,621
Int. Cl.[2] B01D *13/02;* E02D *7/26*
U.S. Cl. 204—299 R 11 Claims



1. An apparatus for assisting the driving of an electrically conductive pile into soil containing water comprising,
the outside of said pile being coated with a dielectric coating except that the lower end of the pile is uncoated for providing an electrical cathode at the lower end,
a d-c power source, thereon
an electrical conductor connected between the negative output of the power source and the conductive pile,
an anode positioned outside of said pile in water, and
a second electrical conductor connected between the anode and the positive output of the power source whereby friction between the pile and the soil is reduced.

4,124,484

DEVELOPER COMPOSITION AND PROCESS FOR PENETRANT INSPECTION

Amos G. Sherwin, 8330 Gainford St., Downey, Calif. 90240

Filed Jan. 26, 1978, Ser. No. 872,483
Int. Cl.[2] C09K *11/06;* G01N *19/08;* C09K *3/00*
U.S. Cl. 252—301.19 2 Claims

1. A dry powder developer composition for inspection of surfaces by the fluorescent penetrant method which composition consists of 30% or more by weight of aluminum benzoate powder with the aluminum benzoate powder in finely divided form having a particle size of less than 2 microns.

4,124,485

SEPARATION OF SOLIDS FROM COAL LIQUIDS WITH AN ADDITIVE BLEND

Norman L. Carr, Allison Park, and Edgar L. McGinnis, Gibsonia, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Apr. 4, 1977, Ser. No. 784,049
Int. Cl.[2] C10G *1/06*
U.S. Cl. 208—8 11 Claims

1. In a process for removing ash from coal including a dissolving step wherein coal hydrocarbonaceous material is dissolved with a hydroaromatic solvent to produce an effluent stream comprising dissolved coal liquid, hydroaromatics and suspended ash-containing solids, and passing said effluent stream to a solids-liquid separation step, the improvement comprising adding a blend comprising alcohol and a light oil fraction boiling no higher than about 500° F. to said effluent stream in advance of said solids-liquid separation step, said alcohol comprising an aliphatic alcohol containing between 2 and 10 carbon atoms which forms a homogeneous composition within said coal liquid.

4,124,486

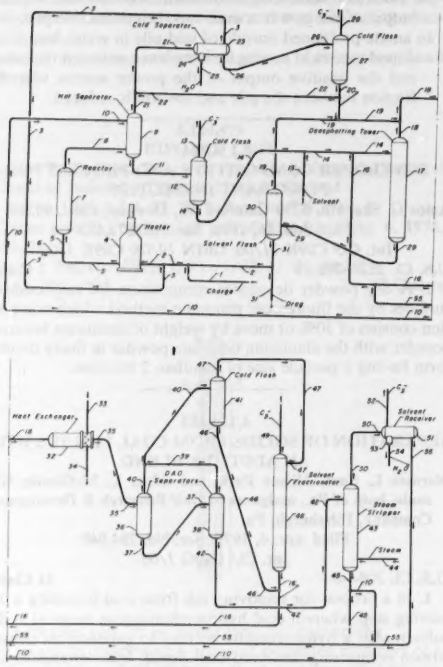
CONVERSION OF ASPHALTENE-CONTAINING CHARGE STOCKS AND PRODUCT SEPARATION PROCESS

John P. Nolley, Jr., Glendale Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Sep. 14, 1977, Ser. No. 833,331
Int. Cl.[2] C10G *37/02*
U.S. Cl. 208—95 9 Claims

1. A process for separating a mixture of a hydrocarbon-selective solvent comprising a light hydrocarbon having from about 3 to about 7 carbon atoms per molecule and deasphalted oil which comprises the sequential steps of:
(a) introducing said mixture into a first separation zone, at superatmospheric pressure and a first temperature above the critical temperature of said solvent, to provide (i) a first solvent-rich vaporous phase, and, (ii) a first solvent-lean liquid phase;
(b) introducing said first liquid phase into a second separation zone, at substantially the same pressure and a higher second temperature to provide (i) a second solvent-rich vaporous phase and, (ii) a second solvent-lean liquid phase;
(c) introducing said first and second vaporous phases into a third separation zone, at a lower pressure and lower third temperature, (i) to recover a solvent concentrate and, (ii) to provide a solvent-lean vaporous phase;

(d) distilling said solvent-lean vaporous phase to remove hydrocarbons boiling below the boiling point of said solvent and to recover additional solvent concentrate; and,



(e) stripping solvent from said second liquid phase to recover substantially solvent-free deasphalted oil.

4,124,487

PROCESS FOR REFORMING AND DEWAXING BY SELECTIVE HYDROCRACKING OF HYDROCARBON FRACTIONS

Albert M. Tsybulevsky, ulitsa Krasnykh partizan, 244, kv. 4, Krasnodar; Kapitolina P. Danilushkina, ulitsa Gafuri, 3, kv. 39, Kazan, and Petr M. Pak, ulitsa Pushkina, 99, kv. 60, Krasnodarsky krai, poselok Afipsky, all of U.S.S.R.

Filed Jun. 2, 1977, Ser. No. 802,630

Int. Cl.[2] **C10G** *13/06, 35/06;* **C07C** *9/04;* **C01B** *29/28*

U.S. Cl. 208—111 **3 Claims**

1. A process for selective hydrocracking of hydrocarbon fractions, residing in that said hydrocarbon fractions are brought in contact with hydrogen at a respective ratio of 1:2.5–20, a temperature of 280°–520° C. and a pressure of 15–100 kgf/cm^2 on a zeolite catalyst with pore sizes measuring from 4.6 to 6.0 A and containing 0.1 to 5 wt.% of a metal of Group VIII of the periodic system, and a tervalent chromium cation with a minimum exchange capacity equal to 30 percent.

4,124,488

WATER PURIFICATION BY REVERSE OSMOSIS

Leslie P. S. Wilson, Nassau, The Bahamas, assignor to Ocean Water Limited, Nassau, The Bahamas

Filed Feb. 24, 1977, Ser. No. 771,464

Claims priority, application United Kingdom, Feb. 27, 1976, 7854/76; Apr. 21, 1976, 16157/76; Aug. 12, 1976, 33621/76

Int. Cl.[2] **B01D** *13/00;* **C02B** *1/82*

U.S. Cl. 210—134 **20 Claims**

1. An apparatus for the reverse osmosis purification of water under high pressure comprising:

(a) an elongated housing of the same cross-sectional size throughout its length and having a closed front end and a closed rear end;

(b) a piston-like movable partition disposed transversely in the housing and separating the housing into two separate and non-communicating chambers, said partition having a front face and a rear face;

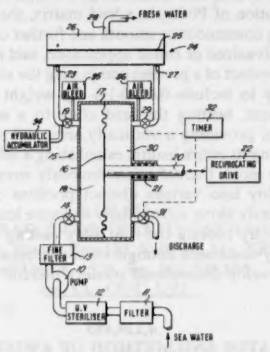
(c) an actuating rod having an inner end portion connected to the rear face of the movable partition with the rod extending therefrom to the rear end of the housing and having an outer end portion sealingly slidably disposed through the rear end of the housing and power drive means operatively connected to the outer end portion for reciprocably moving the partition in the housing between the ends thereof;

(d) said front face of the partition facing the front end of the housing and defining therewith a variable feed liquid chamber;

(e) inlet means communicated with the feed chamber for supplying a supply of liquid, such as seawater, to the feed chamber;

(f) valve means for said inlet means to prevent the return of supply liquid therethrough from the feed liquid chamber;

(g) a reverse osmosis module comprising a housing divided by a semipermeable osmostic membrane, a separate liquid inlet and outlet in the housing on one side of the membrane and an outlet for fresh water in said housing on the other side of the membrane;



(h) outlet means from the feed chamber separate from the inlet means and connected to the liquid inlet for the osmosis module housing;

(i) valve means for said outlet means to prevent the return of liquid from the osmosis module housing to the feed chamber;

(j) said rear face of the partition facing the rear end of the housing and defining therewith a variable return liquid chamber;

(k) said partition being moved by the power drive means with the opposite faces thereof being under high liquid pressure and with substantially the same pressure existing on the opposite faces of the partition;

(l) the rear face of the partition being of a cross-sectional area less than that of the front face to the extent of the cross-sectional area of the actuating rod with the ratio of such cross-sectional area of the actuating rod to the front face of the partition being substantially the same as the extraction ratio of the purified water to the supply liquid entering the feed liquid chamber and with said areas of said faces of the partition being in accordance with the extraction ratio so as to avoid a pressure difference across the partition.

(m) a liquid connection between the outlet in the osmosis module housing and the return liquid chamber and communicating said outlet with the return liquid chamber so

that return from the osmosis module housing is applied to the rear face of the partition;

(n) first valve means allowing the flow of the return liquid from said outlet into the return liquid chamber as the partition is moved by the actuating rod toward the front end of the housing to force the supply liquid into the osmosis module housing;

(o) outlet means from the return liquid chamber for the discharge therefrom of return liquid;

(p) second valve means allowing the flow of the return liquid through said outlet means as the partition is moved rearwardly in the housing and supply liquid enters the feed chamber; and,

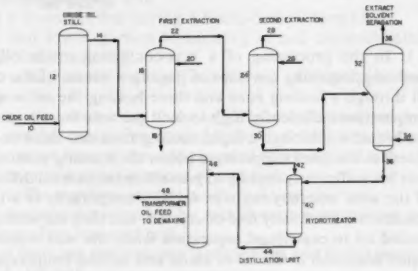
(q) control means controlling the alternate opening and closing of the first and second valve means in accordance with the movement of the partition toward the ends of the housing whereby the partition circulates the supply liquid through the osmosis module housing on each forward stroke, with the high pressure being approximately balanced on opposite faces of the partition throughout the operating movements of the partition, and on the return stroke draws fresh supply liquid into the feed chamber and passes the return liquid from the return chamber thus ensuring that the pressures on the opposite faces of the partition are substantially balanced.

4,124,489

PRODUCTION OF TRANSFORMER OIL FEED STOCKS FROM WAXY CRUDES

Lloyd E. Reid, Sarnia, Canada, assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 16, 1977, Ser. No. 768,961
Int. Cl.[2] C10G *41/00*
U.S. Cl. 208—87 **20 Claims**



1. A process for producing a transformer oil feed stock from a paraffinic oil which comprises:

(a) mildly solvent extracting a light, untreated distillate fraction from a paraffinic crude oil at a temperature ranging from about 110° to 180° F. so that most of the multi-ring aromatic and polar constituents of the oil are removed therefrom as a first extract thereby producing a first raffinate and a first extract;

(b) solvent extracting said first raffinate at a temperature ranging from about 110° to 180° F. and at a treat rate of solvent to first raffinate oil of from about 85 to 165 LV% so that most of the aromatic and naphthenic components are removed from the first raffinate oil as a second extract and separating solvent from said second extract to obtain a waxy oil therefrom;

(c) contacting said waxy oil with hydrogen at hydrotreating conditions in the presence of a hydrotreating catalyst to form a hydrotreated oil; and

(d) distilling said hydrotreated oil to obtain a transformer oil fraction therefrom as a heart cut fraction having a 5 to 95 LV% boiling range between about 595° to 750° F.

4,124,490

HYDROCARBON REFORMING PROCESS

Thomas A. Collins, Country Club Hills, and Andrew P. Voss, South Holland, both of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Filed Mar. 2, 1977, Ser. No. 773,582
Int. Cl.[2] C10G *35/08*
U.S. Cl. 208—139 **10 Claims**

1. A hydrocarbon reforming process which comprises:

1. contacting a hydrocarbon feed with a catalyst comprising a major amount of a porous solid support, a minor catalytically effective amount of at least one platinum group metal component and a minor catalytically effective amount of at least one rhenium component in the presence of hydrogen in at least one reaction zone at hydrocarbon reforming conditions including a temperature in the range of about 500° F. to about 650° F. for a time sufficient to improve the catalytic activity stability of said catalyst; and thereafter,

2. contacting a hydrocarbon feed with said catalyst in the presence of hydrogen at hydrocarbon reforming conditions including a higher temperature than the temperature at which step (1) occurred.

4,124,491

HYDROCARBON CONVERSION WITH A SELECTIVELY SULFIDED ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights; John C. Hayes, Palatine, and Roy T. Mitsche, Wauconda, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed May 9, 1972, Ser. No. 795,055
Int. Cl.[2] C10G *35/08*
U.S. Cl. 208—139 **13 Claims**

1. In a process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with a selectively sulfided acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 2 wt. % rhenium, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal and rhenium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein the composite contains sulfur in an amount at least sufficient to provide an atomic ratio of sulfur to rhenium of about 0.5:1 so that a substantial portion of the rhenium is maintained in a sulfided state; and wherein the sulfided state of the rhenium is continuously maintained for the duration of the hydrocarbon conversion process, the improvement which comprises the use of a Ziegler alumina as said porous carrier in combination with said platinum group metal component, said sulfided rhenium component and said halogen component.

4,124,492

PROCESS FOR THE RECLAMATION OF WASTE HYDROCARBON OILS

David T. Fung, Longueuil; J. G. Jacques Laberge, McMasterville, and Frederick S. Przystal, St. Bruno, all of Canada, assignors to Canadian Industries Limited and Tricil Limited, both of Montreal, Canada

Filed Sep. 1, 1977, Ser. No. 829,637
Claims priority, application Canada, May 19, 1977, 278793
Int. Cl.[2] C10G *37/00*; C10M *11/00*
U.S. Cl. 208—180 **5 Claims**

1. A process for reclaiming waste hydrocarbon oils comprising the sequential steps of:

(a) heating waste hydrocarbon oil at from 150° C. to 210° C. and atmospheric pressure, or at the sub-atmospheric pressure/temperature equivalent thereof, to reduce the water content of the oil to less than 3% by weight and to reduce

the ethylene glycol content of the oil to less than 15% by weight;

(b) mixing one part by weight of the dehydrated/deglycolated waste oil with a solvent selected from at least 2.2 parts by weight of isopropanol or at least 1.5 parts by weight of N-propanol or proportioned mixture of these at a temperature of from 45° C. to 80° C.;

(c) separating the undissolved, suspended waste matter from the heated oil/propanol solution, and

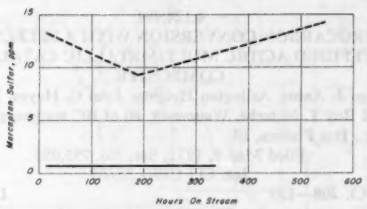
(d) distilling the residual oil/propanol solution to separate and recover the oil fraction and the solvent fraction.

4,124,493

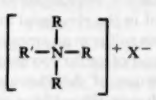
CATALYTIC OXIDATION OF MERCAPTAN IN PETROLEUM DISTILLATE INCLUDING ALKALINE REAGENT AND SUBSTITUTED AMMONIUM HALIDE

Robert R. Frame, Glenview, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 24, 1978, Ser. No. 880,723
Int. Cl.² C10G *27/06*
U.S. Cl. 208—206 **11 Claims**



1. A process for treating a mercaptan-containing sour petroleum distillate to oxidize the mercaptan present in said distillate, said process comprises contacting said distillate with (a) a supported mercaptan oxidation catalyst (b) an oxidizing agent, an alkaline agent and (d) a substituted ammonium halide represented by the structural formula



wherein R is a hydrocarbon radical containing up to about 20 carbon atoms and selected from the group consisting of alkyl, cycloalkyl, aryl, aralkyl and alkaryl, R^1 is a substantially straight chain alkyl radical containing from about 5 to about 20 carbon atoms, and X is a chloride, fluoride, bromide or iodide.

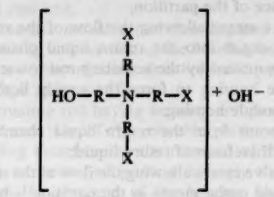
4,124,494

TREATING A PETROLEUM DISTILLATE WITH A SUPPORTED METAL PHTHALOCYANINE AND AN ALKANOLAMINE HYDROXIDE

Robert R. Frame, Glenview, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 11, 1978, Ser. No. 868,600
Int. Cl.² C10G *27/06*
U.S. Cl. 208—207 **10 Claims**

1. A process for treating a mercaptan-containing sour petroleum distillate to oxidize the mercaptan present in said distillate, said process comprises passing said distillate in admixture with an oxidizing agent through a fixed bed of a supported metal phthalocyanine catalyst in the presence of an alkanolamine hydroxide having the structural formula



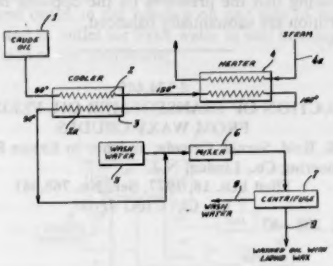
wherein R is an alkylene radical containing up to about 3 carbon atoms, and X is a hydroxyl radical or hydrogen.

4,124,495

PROCESSING OF CRUDE OILS

Graydon C. Bazell, Poughkeepsie, N.Y., assignor to The de Laval Separator Company, Poughkeepsie, N.Y.

Filed Feb. 28, 1977, Ser. No. 772,853
Int. Cl.² C10G *17/00*
U.S. Cl. 208—251 R **3 Claims**



1. In the processing of a wax-containing crude oil, the method comprising the steps of passing a stream of the crude oil through a heating zone and there heating the oil to a first temperature sufficiently high to melt the wax therein, passing the heated oil through a rapid cooling zone and there cooling the oil to a second temperature below the freezing point of the wax but sufficiently rapidly to prevent immediate solidification of the wax, whereby the wax remains temporarily in a liquid condition substantially free of crystals, and then subjecting the cooled oil to centrifugal separation while the wax is still in a liquid condition in the oil at about said second temperature.

4,124,496

SEPARATION OF MULTI-COMPONENT MIXTURES

Donald R. Cummings, Anchor Cottage, Coln St. Dennis, Cheltenham, England

Filed Jul. 22, 1977, Ser. No. 818,337
Claims priority, application United Kingdom, Jul. 28, 1976, 31471/76
Int. Cl.² C10G *7/00*; B01D *3/06*
U.S. Cl. 208—361 **19 Claims**

1. In a process for the separation of a multi-component hydrocarbon mixture at superatmospheric pressure into a gaseous phase and a liquid phase by a multi-stage flash separation in which each stage operates at a lower pressure than the preceding stage, the feed to each of the separation stages after the first is provided by the liquid fraction recovered from the immediately preceding stage, and at least a part of the gaseous fraction recovered from a stage after the first stage is recompressed, recycled and in the gaseous phase mixed with the liquid feed to the preceding stage, the improvement wherein the recompression of said gaseous fraction part is effected by compression of said gaseous fraction part in compressor means and then by

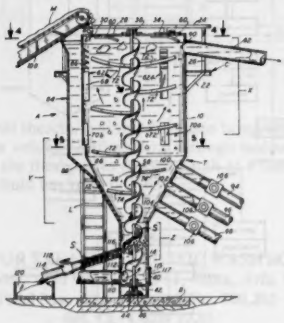
supplying said compressed fraction part in the gaseous phase and at a pressure lower than that of the preceding stage to the low pressure zone of ejector means in which said liquid feed to the preceding stage is expanded, and said gaseous fraction part and said liquid feed are intimately mixed in said ejector means.

4,124,497

APPARATUS FOR SEPARATING MINERAL AND THE LIKE FROM EARTH AND THE LIKE

Trueman L. Hulegard, 14411 Round Lk. Rd., Anoka, Minn. 55303

Filed Jul. 2, 1976, Ser. No. 702,112
Int. Cl.[2] B03B *1/00, 5/66*
U.S. Cl. 209—3 **4 Claims**



1. An apparatus for separating minerals and the like from earth and the like comprising:
(a) a tank including an upper portion terminating in and communicating with
(b) a lower portion having a frusto-conical formation,
(c) said lower portion terminating in and communicating with a chamber,
(d) outlet means leading from the top of said upper tank portion,
(e) inlet means leading to the top of said upper tank portion,
(f) rotative means for causing a flow of fluid in said tank portions from within said chamber upwardly and into said lower and upper portions of said tank,
(g) baffle members secured to the inside of the tank,
(h) bar members carried by said flow causing means and extending into said tank,
(i) at least one outlet means leading from said lower portion of said tank,
(j) an outlet for separated material leading from said chamber, and
(k) a fluid inlet leading into said chamber removed from said outlet for separated material,
(l) said baffle members including shredding means, and
(m) said rotative means includes an auger extending through said chamber and said lower and upper portions of said tank.

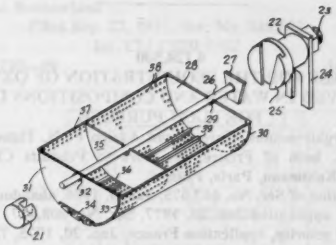
4,124,498

SEMI-CYLINDRICAL OSCILLATING SIFTER

Robert E. Russell, 2710 Landers Ave., Nashville, Tenn. 37211

Filed Mar. 11, 1977, Ser. No. 776,939
Int. Cl.[2] B07B *1/28*
U.S. Cl. 209—267 **5 Claims**

1. A sifter for separating large particles from fine particulate matter comprising: a perforated sifter panel of substantially semi-cylindrical configuration having parallel end panels disposed at extremities of said sifter panel in which said sifter panel and said end panels are oriented to be on an incline relative to a true horizontal plane and in which one of said end panels is vertically lower than the other, wherein the lower end panel is provided with an aperture at its lower extent, said sifter further including a baffle panel disposed parallel to and inbetween said end panels, said baffle panel further having an aperture at its lower extent so that said sifter panel, end panels and baffle panel define two isolated upper and lower compartments inter-connected by said aperture on said baffle panel and said sifter is provided with means to oscillate said sifter whereby the material to be sifted is disposed within the upper compartment and the sifter is oscillated and said baffle panel serves to delay the deployment of the material to the lower



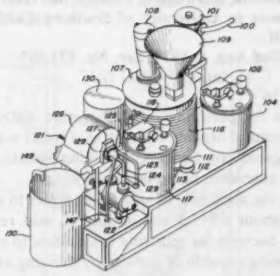
compartment; said means to oscillate said sifter includes a shaft which supports said sifter at said end panels and shaft is inclined from the horizontal similar to said end panels, said shaft supported at its lower end by an open top bushing and at its upper end by a tapered block connected to said shaft which nests within a bayonet bracket, said bayonet bracket having a tapered slot complimentally formed to receive said tapered block, said bayonet bracket further connected to an inverted substantially U-shaped yoke which is slideably disposed on a motor driven crank whereby said motor driven crank provides oscillatory motion.

4,124,499

SEWAGE TREATMENT SYSTEM

Millice F. Hobbs, Monte Sereno, and Arthur C. Green, Felton, both of Calif., assignors to FMC Corporation, San Jose, Calif.

Continuation of Ser. No. 655,032, Feb. 3, 1976, abandoned, which is a continuation of Ser. No. 446,938, Feb. 28, 1974, abandoned, which is a continuation of Ser. No. 255,685, May 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 187,617, Oct. 8, 1971, abandoned. This application Feb. 4, 1977, Ser. No. 766,105
Int. Cl.[2] C02C *1/40*
U.S. Cl. 210—28 **26 Claims**



1. A process for treatment of sewage and rapidly producing a disposable mass of solids and a hygenic effluent of relatively low BOD, low suspended solids, and low phosphorus content which comprises the steps of (1) establishing a mixture of sewage with four additives, said sewage having solids present therein of a particle size resulting from flow through a zone adapted to effect coarse disintegration of any solids exceeding

a predetermined size, said additives being a bactericidal agent, a colloidal solids coagulating agent, a filter aid and an adsorbent, (2) passing the mixture through a liquid and airtight flow system without permitting any of the solids therein to settle to effect an intimate mixing of the additives and said sewage and to maintain an unsettled mixture of aqueous medium and suspended solids and then (3) passing the unsettled mixture through a differential pressure type filter unit to separate the solids from the liquid portion of said mixture to produce a substantially solids free effluent.

4,124,500

PROCESS FOR THE SEQUESTRATION OF OXYGEN DISSOLVED IN WATER AND COMPOSITIONS USEFUL FOR SUCH PURPOSE

Basile Arghiropoulos, Cavern, and Adrien P. N. Tignol, Montrejeau, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

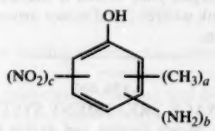
Continuation of Ser. No. 647,675, Jan. 9, 1976, abandoned. This application Jun. 20, 1977, Ser. No. 808,417

Claims priority, application France, Jan. 20, 1975, 75 01607

Int. Cl.[2] C02B *1/18*

U.S. Cl. 210—59 **7 Claims**

1. In the process of removing oxygen dissolved in water which comprises placing an aqueous hydrazine solution into contact with said water for a period of time sufficient to remove said dissolved oxygen, the improvement whereby said oxygen is more rapidly removed consisting essentially of adding to said hydrazine solution an amount of a compound of the formula:



wherein $a = 0, 1$ or 2; $b = 0, 1, 2$ or 3; $c = 1, 2$ or 3; $b + c = 2$ or 3; and $a + b + c = 3, 4$ or 5, sufficient to increase the rate of removal of said dissolved oxygen from said water.

4,124,501

PURIFYING OIL SHALE RETORT WATER

Teh F. Yen, Altadena, and John E. Findley, San Gabriel, both of Calif., assignors to University of Southern California, Los Angeles, Calif.

Filed Aug. 4, 1977, Ser. No. 821,897

Int. Cl.[2] C02C *1/17*

U.S. Cl. 210—16 **33 Claims**

1. A process for purifying oil shale retort water having a substantial amount of organic content, said retort water having sufficient inorganic components, including sulfate, to enable the growth of anaerobic bacteria, comprising:

(a) lowering the alkalinity of said retort water to a pH in the range of about 6.5–7.5 and adding to said retort water anaerobic bacteria for reducing said sulfate to sulfide, said bacteria being capable of growth by utilizing said organic content;

(b) producing in said retort water under anaerobic conditions a growth of cell biomass of said bacteria aggregated into a flocculent mass, and reducing said sulfate to sulfide; and thereafter

(c) removing said aggregated cell biomass from said retort water; and

(d) oxidizing said sulfide to sulfate.

4,124,502

PROCESS FOR THE PURIFICATION OF GREASY AND SOILED WATER USING A HEAVY SOLVENT, AND APPARATUS FOR ITS IMPLEMENTATION

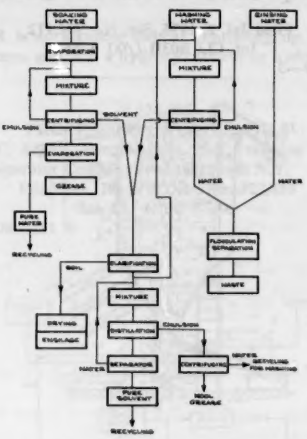
Bernard J. O. Leman, Leers, France, assignor to Peignage Amédée, Roubaix, France

Filed Apr. 28, 1977, Ser. No. 791,933

Claims priority, application France, May 5, 1976, 76 13372

Int. Cl.[2] B01D *3/36, 11/00*; C02C *5/00*

U.S. Cl. 210—21 **13 Claims**



1. A process for purifying waste water containing grease and soil which comprises:

mixing waste water containing greasy matter and soil with a heavy solvent in a mixing device in a solvent to water ratio of 1 part solvent to 3 to 8 parts water to form an emulsion;

centrifuging the emulsion to obtain degreased water, a small quantity of water-solvent emulsion and solvent containing greasy matter and soil;

separating the soil from the solvent containing greasy matter and drying the soil;

azeotropically distilling the solvent containing greasy matter in the presence of water to recover pure solvent as the head product and a tail product containing greasy matter; and

centrifuging the tail product to isolate the greasy matter.

4,124,503

MAGNETIC SEPARATORS, APPARATUS AND METHOD

James H. P. Watson, St. Austell, England, assignor to English Clays Lovering Pochin & Co. Limited, Cornwall, England

Filed May 28, 1976, Ser. No. 690,935

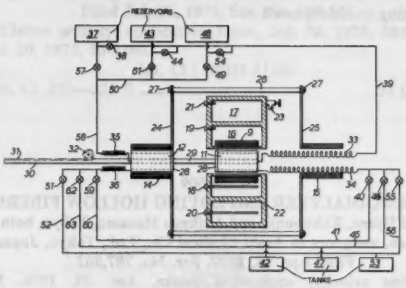
Claims priority, application United Kingdom, May 29, 1975, 23522/75; Jan. 7, 1976, 887/76

Int. Cl.[2] B01D *17/06*

U.S. Cl. 210—42 S **23 Claims**

1. In a moving matrix magnetic separator for separating magnetisable particles from a fluid by means of a magnetic field, an elongate separating chamber movable into and out of the magnetic field, the longitudinal axis of said separating chamber being parallel to the direction of movement, said separating chamber having an input, an output and two fluid permeable partitions for defining three compartments within said separating chamber each extending substantially the full length of the separating chamber, one of said compartments being an input compartment having said input connected thereto, a second of said compartments being an output compartment having said output connected thereto, and a third of said compartments being a separating compartment, said sepa-

rating compartment being positioned between said input compartment and said output compartment, and including walls formed by said two fluid permeable partitions, said separating compartment having a fluid permeable matrix means of magnetisable material therein, said matrix means being arranged such that the linear velocity of fluid flow through said matrix means decreases as the fluid passes therethrough as a function of the distance the fluid has travelled therein.



4,124,504

PROCESS FOR TREATING CAUSTIC WASH SOLUTIONS

George Munden, 1024 W. Main, #61, Mesa, Ariz. 85201

Filed May 25, 1977, Ser. No. 800,303

Int. Cl.[2] C02B *1/20*

U.S. Cl. 210—50 **4 Claims**

1. A method for chemical purification of contaminated caustic wash solution which comprises,
   (a) removing any layered contaminants from the wash solution;
   (b) adding potassium permanganate to the contaminated wash solution in an amount ranging from about 0.2 parts to about 5 parts permanganate per 100 parts wash solution;
   (c) allowing precipitated contaminants to settle; and
   (d) separating precipitated contaminants from the wash solution.

4,124,505

DEGRADATION OF ORGANIC COMPOUNDS IN EFFLUENTS BY WET OXIDATION

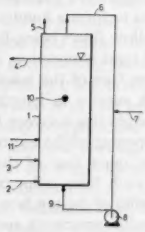
Otto Horak, Cologne; Hans-Ulrich Alles, Blecher; Walter Horstmann, Schildgen; Knut Hammerström, Leverkusen, and Ruthard Potthast, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 6, 1976, Ser. No. 748,074

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1975, 2555536; Dec. 31, 1975, 2559374

Int. Cl.[2] C02C *5/04*

U.S. Cl. 210—63 R **8 Claims**



1. In the degradation of organic compounds in an effluent by oxidizing the effluent at an elevated temperature with oxygen, the improvement which comprises effecting the oxidation at a redox potential of from about 350 to 450 millivolts, as measured with a platinum electrode against a silver-silver chloride electrode, at a pH below about 2, a temperature of from about 80° to 250° C. and under a pressure of from about 3 to 200 bars, the redox potential being maintained by a catalyst system comprising Fe^{2+} and Fe^{3+}.

4,124,506

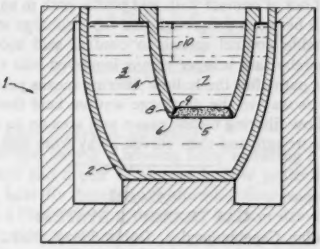
METHOD FOR THE FILTRATION OF MOLTEN METAL IN A CRUCIBLE TYPE FURNACE

James E. Dore, Ballwin, Mo., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Sep. 22, 1977, Ser. No. 835,682

Int. Cl.[2] C22B *9/02*

U.S. Cl. 210—69 **14 Claims**



1. In the filtration of molten metal with a removable filter plate the method which comprises:
   providing a furnace crucible having means to charge said furnace crucible with molten metal;
   providing a ladling crucible means comprising a filter element having an open cell structure characterized by a plurality of interconnected voids;
   inserting said ladling crucible means in said furnace crucible wherein said ladling crucible slides on a support; and
   charging said furnace crucible with molten metal wherein said molten metal passes from said furnace crucible through said filter element into said ladling crucible, thereby removing impurities from the molten metal.

4,124,507

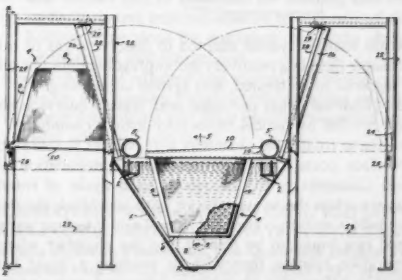
RECIPROCATING VACUUM FILTER

Flavio J. Mazzetti, 6580 Arequa Ridge La., Colorado Springs, Colo. 80919

Filed Sep. 16, 1976, Ser. No. 723,980

Int. Cl.[2] B01D *29/02*

U.S. Cl. 210—141 **5 Claims**



1. In a filtering apparatus comprising an upwardly open trough adapted to contain a liquid to be filtered,
   first and second filtering means each comprising a plurality of filter elements interleaved with each other when positioned in the trough,

first and second drive means operably connected to the respective first and second filtering means;

a pair of spaced apart parallel drive shafts disposed along opposite sides of said trough, each of said shafts carrying the filter means of the respective first and second sets thereof and means interconnecting each of said drive shafts with the respective drive means whereby operation of said drive means rotates said shafts about their longitudinal axis, and moves said hollow filtering means about an axis through a substantially planar path from said trough to a discharge station and back again;

frame means including movable scraper means and support means to position said scraper means adjacent the substantially planar path of said hollow filtering means, and said frame means further including moving means to move said scraper means into and out of contact with said path, and wherein said moving means moves said scraper means into and out of contact with said planar path in an area of said path between the trough and the discharge station; and

adjustable control means to control said moving means whereby said scraper means is moved into contact with said path after the hollow filtering means passes said area on its way to the discharge station, held there until said hollow filtering means passes said area on its way back to said trough, and then moved away from said path.

4,124,508

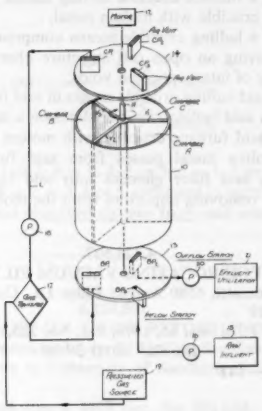
GAS TRANSFER SYSTEM

Constantine Capetanopoulos, Dobbs Ferry, N.Y., assignor to Ecolotrol, Inc., Bethpage, N.Y.

Filed Oct. 18, 1977, Ser. No. 843,237

Int. Cl.[2] C02B *5/04;* B01F *3/04*

U.S. Cl. 210—194 **17 Claims**



1. A gas transfer system adapted to dissolve a gas or other compressible fluid in a relatively incompressible liquid or other fluent material to be treated, said system comprising:

A. a cylindrical drum provided with station interface ports and divided by radical vanes into distinct chambers;

B. means to rotate said chambers with respect to said station interface ports, said ports being in communication with said chambers in the course of each cycle of rotation except when the vanes register with and block the ports;

C. an inflow station coupled to one of said interface ports to feed raw liquid to be treated into the chamber when in operative relation therewith to produce a liquid batch therein before this chamber is advanced into operative relation with a second interface port;

D. a gas transfer station coupled to said second port to subject the liquid batch in the chamber in operative relation therewith to pressurized gas to effect the absorption of the gas by the liquid batch to produce a treated liquid batch before the chamber is advanced into operative relation with a third of said interface ports; and

E. an outflow station coupled to said third port to discharge the treated batch therefrom and thereby empty the chamber so that it can be refilled with raw liquid and the operating cycle repeated.

4,124,509

HAEMODIALYZER EMPLOYING HOLLOW FIBERS

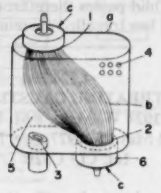
Seiichi Iijima, Kokubunji, and Akikazu Hazama, Tokyo, both of Japan, assignors to Asahi Medical Co., Ltd., Tokyo, Japan

Filed Apr. 14, 1977, Ser. No. 787,562

Claims priority, application Japan, Apr. 21, 1976, 51-48873[U]

Int. Cl.[2] B01D *31/00*

U.S. Cl. 210—321 B **6 Claims**



1. A haemodialyzer which comprises:

(a) a housing having a top and bottom face connected by a sidewall structure,

(1) said top and bottom face each having respective openings with the center axes lateraly staggered from each other,

(2) a lower portion of said housing including said bottom face and part of said sidewall structure, having a dialyzate intake which opens inside the housing to release the dialyzate into a passage defined by the inner face of the housing,

(3) an upper portion of said housing, including said top face and part of said sidewall structure, having a dialyzate exit for collecting the dialyzate to flow out of the housing,

(4) said dialyzate intake and exit being in a positional relation that they locate on the opposite sides of a line connecting said openings of top and bottom face of the housing;

(b) a vast plurality of semi-permeable hollow fibers substantially equal in length, and gathered and bonded at their both end portions to form a bundle,

the bundle of hollow fibers being fixedly held, at its both ends, in liquid-tight connection, in the openings of the top and bottom face of the housing, respectively, and disposed, with surplus in length with respect to the distance in straight line between the opening of the top face and the opening of the bottom face, in the passage defined by the inner face of the housing so that the hollow fibers each form a line continually descending from said opening of the top face to said opening of the bottom face, while spacingly spreading to expand the bundle, intermediate the ends, in its lateral direction; and

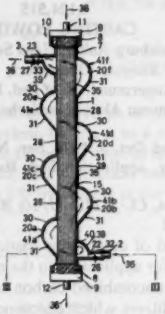
(c) an inlet and outlet for blood formed in association with the respective end portions of the fiber bundle.

4,124,510

CROSS-FLOW, HOLLOW-FIBER PERMEABILITY APPARATUS HAVING SLIT-LIKE INLET MEANS

Yasushi Joh, Yokohama, Japan, assignor to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1976, Ser. No. 707,513
Claims priority, application Japan, Jul. 28, 1975, 50-91716; Jul. 30, 1975, 50-92902
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—321 B 31 Claims



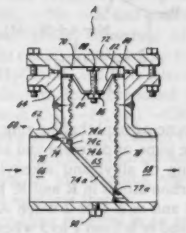
1. In a hollow-fibre permeability apparatus, comprising:
a housing defining an interior including a permeating region;
a bundle of permeable-wall hollow fibres disposed at least in said permeating region of said housing;
a first inlet and means for causing a first fluid to flow into said first inlet and through said housing adjacent the exterior wall surfaces of said fibres;
a first outlet for passage of said first fluid out of said housing;
a second inlet and means for causing a second fluid to flow into said second inlet and through said housing inside said fibres such that materials selectively permeate through the walls of said fibres; and
portions of said housing in said permeating region being of enlarged cross-section relative to said bundle to define spaces between said bundle and a wall of said housing into which at least part of said first fluid passes during its passage from said first inlet to said first outlet, the shape of said enlarged cross-section portions promoting cross-flow of said first fluid relative to the length of said fibres,
the improvement comprising means for imparting a lamelliform flow to said first fluid comprising an opening defined by said first inlet, said opening through which said first fluid must pass extending transversely a distance l_2 across one side of a cross-section of said permeating region in a direction substantially perpendicular to the length direction of said fibers, and said opening extending longitudinally a distance d_2 in the length direction of said fibers, d_2 being substantially smaller than l_2 whereby the opening is slit-like in character, the lamelliform flow of said first fluid thereby engaging only a small portion of said bundle positioned opposite said opening whereby said lamelliform flow first progresses through said bundle into a said enlarged cross section portion, then cross-flows through the bundle, and thereafter progresses to said first outlet.

4,124,511

FLUID FILTER APPARATUS OF STANDARDIZED PIPE DIMENSION HAVING INTERCHANGEABLE FILTER MEANS POSITIVELY SECURED THEREIN

Joe B. Lay, Houston, Tex., assignor to Fabricated Services, Inc., Houston, Tex.

Filed May 23, 1977, Ser. No. 799,191
Int. Cl.[2] B01D *35/02*
U.S. Cl. 210—447 2 Claims



1. A fluid filter apparatus, including:
a T connection having a housing body including a hollow projection and a pair of aligned hollow projections extending laterally therefrom for forming flow passages and to form a filter receiving section of uniform size throughout its longitudinal extent;
an inwardly extending annular flange stop ring formed on one of said aligned hollow projections and projecting radially inwardly of said aligned hollow projections to define one end of the filter receiving section;
an external annular flange formed on the other of said aligned projections;
closure flange means removably mounted with said external annular flange for closing said projection when filtering solids from the fluid passing through said housing;
a hollow annular filter member positioned in the filter receiving section formed by said lateral projections, said annular filter member including:
a core formed of coils spaced a predetermined amount, forming a first core end and a second core end;
a plurality of circumferentially spaced ribs extending longitudinally of said core;
said ribs having a surface secured to said core;
said first end of said core sealingly engageable with said stop ring for seating on said inward extending annular flange and to retain said core in uniform spaced relation inwardly relative to said pair of aligned hollow projections;
an outwardly extending annular flange formed adjacent said second end of said core for holding said core in uniform spaced relation relative to said pair of aligned hollow projections by engaging said body about the periphery of said flange; and
means disposed adjacent said second end of said core and within said housing for adjustably engaging said closure flange for holding said filter member in sealing engagement with said stop ring.

4,124,512

OIL RECOVERY BY WATERFLOODING EMPLOYING SUCCINIMIDO ARYL SULFONATE SURFACTANTS

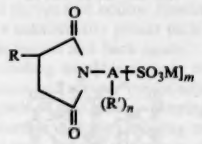
Stamoulis Stournas, Flemington, and El-Ahmadi Ibrahim Heiba, Princeton, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 488,885, Jul. 15, 1974, abandoned. This application Aug. 31, 1976, Ser. No. 719,135
Int. Cl.[2] E21B *43/22*
U.S. Cl. 252—8.55 D 17 Claims

1. In the recovery of oil from a subterranean oil reservoir

penetrated by spaced injection and production systems defining a recovery zone of said reservoir, the method comprising:

introducing into said reservoir, via said injection system, an aqueous solution, containing from about 0.1% to about 5% by weight of an anionic surfactant comprising a hydrocarbyl substituted succinimido aryl sulfonate having the formula



where A is a benzene or naphthalene ring;

R and R′ are the same or different and are selected from the class consisting of alkyl and alkenyl radicals, the total number of carbon atoms in R and R′ being from 10 to 50;

n is from 0 to 3 and *m* is 1 or 2 when A is a benzene ring;

n is from 0 to 4 and *m* is from 1 to 3 when A is a naphthalene ring; and

M is selected from the class consisting of alkali and alkaline earth metals, ammonium or substituted ammonium; and recovering oil from said production system.

4,124,513

SYNTHETIC AIRCRAFT TURBINE LUBRICATING OIL COMPOSITIONS

Roberta Yaffe, Glenham, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,716

Int. Cl.[2] C10M *1/24, 1/48*

U.S. Cl. 252—46.7 **10 Claims**

1. A synthetic lubricating oil composition for a gas turbine engine comprising a major portion of an aliphatic ester base oil having lubricating properties formed from the reaction of pentaerythritol and an organic monocarboxylic acid having from about 2 to 18 carbon atoms per molecule and containing:

from about 0.3 to 5 percent by weight of the lubricating oil composition of an alkyl or alkaryl phenyl naphthylamine in which the alkyl radical has from 4 to 12 carbons atoms and the alkaryl radical has from 7 to 12 carbon atoms,

from about 0.3 to 5 percent by weight of a dialkyldiphenylamine in which the alkyl radicals have from 4 to 12 carbon atoms,

from about 0.001 to 1 percent by weight of a polyhydroxy-substituted anthraquinone,

from about 0.25 to 10 percent by weight of a hydrocarbyl phosphate in which said hydrocarbyl radical contains an aryl ring and contains from about 6 to 18 carbon atoms, and

from about 0.005 to 0.2 percent by weight of an N-alkyl-benzothiazole-2-thione containing from 1 to about 20 carbon atoms in the alkyl portion, linear or branched.

4,124,514

SYNTHETIC AIRCRAFT TURBINE LUBRICATING OIL COMPOSITIONS

Roberta Yaffe, Glenham, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,719

Int. Cl.[2] C10M *1/24, 1/48*

U.S. Cl. 252—46.7 **9 Claims**

1. A synthetic lubricating oil composition comprising a major portion of an aliphatic ester base oil having lubricating properties formed from the reaction of pentaerythritol or a polypentaerythritol or trimethylolpropane and an organic monocarboxylic acid having from about 2 to 18 carbon atoms per molecule and containing:

(a) from about 0.3 to 5 percent by weight of the lubricating oil composition of an alkyl or alkaryl phenyl naphthylamine in which the alkyl radical has from 4 to 12 carbon atoms, and the alkaryl radical has from 7 to 12 carbon atoms,

(b) from about 0.3 to 5 percent by weight of a dialkyldiphenylamine in which the alkyl radicals have from 4 to 12 carbon atoms,

(c) from about 0.001 to 1 percent by weight of a polyhydroxy-substituted anthraquinone,

(d) from about 0.25 to 10 percent by weight of a hydrocarbyl phosphate ester in which said hydrocarbyl radical contains an aryl ring and contains from about 6 to 18 carbon atoms, and

(e) from about 0.1 to about 2.5 percent by weight of dibenzothiophene.

4,124,515

CASTING POWDER

Hans Gruner, Duisburg-Rahm; Hans Schrewe, Duisburg-Ungelsheim; Erich Keuper, Düsseldorf, and Fritz-Peter Pleschhutschnigg, Angermund, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Oct. 3, 1974, Ser. No. 511,786

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1973, 2350244

Int. Cl.[2] B22D *11/10*; B28B *7/36*

U.S. Cl. 252—62 **10 Claims**

1. In a method of continuous casting of steel, the use of a casting powder for application to the molten steel, the powder being free from uncombined carbon but including carbonates or nitrites as additives which decompose completely at a temperature of not more than 600° C. under atmospheric pressure under development of gas pursuant to the decompositioning, for generating a gas barrier against the influx of oxygen into the steel.

4,124,516

DOT-ETCHING SOLUTION

Fumiaki Shinozaki; Tomoaki Ikeda; Yasuo Washizawa, and Sho Nakao, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jul. 20, 1977, Ser. No. 817,475

Claims priority, application Japan, Oct. 18, 1976, 51/124618

Int. Cl.[2] C09K *13/04*

U.S. Cl. 252—79.2 **9 Claims**

1. A dot-etching solution for dot-etching a halftone image of a metal composed mainly of aluminum, said dot-etching solution comprising

(1) water,

(2) (a) phosphorous acid or (b) phosphorous acid and phosphoric acid,

(3) at least one of a bismuth compound and an antimony compound, and

(4) at least one compound selected from hydrogen chloride, an alkali metal chloride, calcium chloride and magnesium chloride.

4,124,517

DRY CLEANING COMPOSITION

Iwao Hisamoto, Suita; Chiaki Maeda; Takayuki Deguchi, both of Settsu; Yukio Omure, Takatsuki, and Takasi Onishi, Higashi-Osaka, all of Japan, assignors to Daikin Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 15, 1976, Ser. No. 723,249

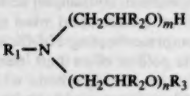
Claims priority, application Japan, Sep. 22, 1975, 50-115315; Dec. 25, 1975, 50-157934; Apr. 16, 1976, 51-44082

Int. Cl.[2] C11D *1/40, 1/44*

U.S. Cl. 252—89 DC **16 Claims**

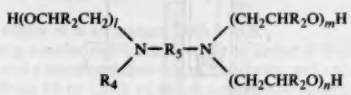
1. A dry cleaning composition comprising an effective components a fluorine-containing hydrocarbon solvent and at least one surfactant dissolved in said solvent and selected from the

group consisting of organic acid salts of monoamines represented by the formula



(I)

wherein R_1 is alkyl having 6 to 20 carbon atoms, R_2 is hydrogen atom or CH_3, m and n are each zero or an integer of 1 to 20, and are further defined by $3 \leqq m + n \leqq 20$, R_3 is hydrogen atom or alkyl having 6 to 20 carbon atoms when n is zero and R_3 is hydrogen atom when m is 1 to 20, and organic acid salts of diamines represented by the formula



(II)

wherein R_2 is as defined above, R_4 is alkyl having 6 to 20 carbon atoms, R_5 is alkylene having 2 to 6 carbon atoms, l is zero or an integer of 1 to 20, m and n are as defined above, and $3 \leqq l + m + n \leqq 20$, said surfactant being present in an amount of from 0.05 to 5% by weight in the fluorine-containing solvent.

4,124,518

ONE-SHOT PROCESS FOR MAKING A FILLED DETERGENT POLYURETHANE FOAM

Herman Stone, Hazleton, and Peter D. Pauly, Mountaintop, both of Pa., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Mar. 24, 1977, Ser. No. 780,701

Int. Cl.[2] **C08G** *18/08, 18/14;* **C08J** *9/12;* **C11D** *17/04*

U.S. Cl. 252—91 **10 Claims**

1. In a process for the manufacture of a filled detergent hydrophilic flexible polyurethane foam from a clay filler, and alkyl aryl sulfonate detergent and a normally liquid polyether polyol, the improvement which comprises mixing the filler and the detergent to form a first mixture, mixing said first mixture with the polyol to form a second mixture, and introducing said second mixture, tolylene diisocyanate and water as a blowing agent into the mixing chamber of a foam machine whereby a filled detergent polyurethane foam is manufactured, wherein said second mixture contains from 20 to 60 per cent by weight of filler, based upon the weight of the polyol, and wherein said second mixture contains from 30 to 80 per cent by weight of sulfonate detergent, based upon the weight of the polyol.

4,124,519

DETERGENT COMPOSITIONS CONTAINING KETAL POLYCARBOXYLATE BUILDER SALTS AND METHODS EMPLOYING THE SAME

Kent P. Lannert, Freeburg, Ill., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 736,962, Oct. 29, 1976. This application Aug. 15, 1977, Ser. No. 824,457

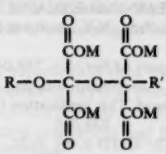
Int. Cl.[2] **C11D** *3/08, 7/26, 7/54*

U.S. Cl. 252—99 **16 Claims**

1. A detergent formulation comprising

(a) from 0.5 to 95% by weight of a surfactant selected from the group consisting of water soluble anionic, nonionic, amphoteric and zwitterionic surfactants, and

(b) from 1 to 95% by weight of a compound of the molecular structure represented by the formula:



wherein M is selected from the group consisting of —H, $—CH_3$, C_2H_5, $—NH_4$, —Na, —K and combinations thereof; R is selected from the group consisting of an alkyl radical (branched or straight chain) containing up to about C_{20}, $—CH(CO_2M)_2$, and $—CH_2CO_2M$, and R′ is selected from the group consisting of an alkyl radical (branched or straight chain) containing up to about C_{20}, —H, and —OR.

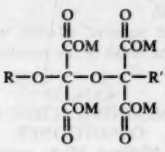
7. A machine dishwashing composition comprising

(a) from 0 to 5% by weight of a surfactant selected from the group consisting of low-foaming anionic and nonionic surfactants and mixtures thereof.

(b) a chlorine providing material in an amount sufficient to provide from about 0.5 to 2% by weight of available chlorine,

(c) from 5 to 30% by weight soluble sodium silicate having an SiO_2 to Na_2O mole ratio of from 1:1 to 3.2:1, and

(d) from 5 to 90% by weight of one or more compounds having the molecular structure represented by the formula:



wherein M is selected from the group consisting of —H, $—CH_3$, C_2H_5, $—NH_4$, Na—K and combinations thereof; R is selected from the group consisting of an alkyl radical (branched or straight chain) containing up to about C_{20}, $—CH(CO_2M)_2$, and $—CH_2CO_2M$, and R′ is selected from the group consisting of an alkyl radical (branched or straight chain) containing up to about C_{20}, —H, and —OR.

4,124,520

ANTI-MICROBIAL BATHROOM CLEANING COMPOSITIONS CONTAINING O-BENZYL-4-CHLOROPHENOL

Lawrence L. Schwalley, Whittier, and Donald J. Ferm, Fullerton, both of Calif., assignors to United States Borax & Chemical Corp., Los Angeles, Calif.

Filed Jun. 20, 1977, Ser. No. 807,774

Int. Cl.[2] **A61K** *31/055, 31/085;* **A61L** *13/00;* **C11D** *3/48*

U.S. Cl. 252—106 **11 Claims**

1. An anti-microbial aqueous solution consisting essentially of water and, by weight, about 0.05 to 0.5% of o-benzyl-4-chlorophenol, about 2 to 15% tetrasodium ethylenediamine tetraacetate or trisodium nitrilotriacetate, about 0.5 to 4% of sodium 2-ethylhexyl sulfate, about 2 to 5% of lower alkanol and about 0.5 to 12% of water-miscible glycol solvent selected from the group consisting of hexylene glycol and polyethylene glycols having a molecular weight of up to about 600.

4,124,521

SOAPS CONTAINING ENCAPSULATED OILS

John E. Jedzinak, Suffern, N.Y., assignor to Revlon, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 749,040, Dec. 9, 1976, abandoned, which is a continuation-in-part of Ser. No. 595,871, Jul. 14, 1975, abandoned. This application Oct. 3, 1977, Ser. No. 838,630

Int. Cl.[2] C11D *9/48, 9/26, 17/04*

U.S. Cl. 252—127 8 Claims

1. A soap bar consisting essentially of a soap base and an oleophilic substance, said base being an alkali metal salt of a fatty acid and said oleophilic substance being substantially uniformly distributed in said soap bar in the form of pressure sensitive or water-soluble microcapsules containing from about 5 to 40% by weight of the oleophilic substance, said capsules comprising about 0.5 to 40% by weight of the soap bar.

4,124,522

METHOD FOR CLEANING MOUTHPIECE OF SMOKING ARTICLE

Boyd O. Barton, 13 Bellerive, Springfield, Ill. 62704

Filed Mar. 2, 1977, Ser. No. 773,612

Int. Cl.[2] C11D *7/26, 7/12;* B08B *3/08*

U.S. Cl. 252—142 3 Claims

1. A method for cleaning a mouthpiece of a smoking article comprising the steps of:

(a) forming an aqueous mixture of citric acid and tartaric acid or lactic acid or salts thereof and sodium bicarbonate;

(b) applying said aqueous mixture to a tobacco stain on the mouthpiece; and,

(c) removing said aqueous mixture whereby the stain is removed and the finish of the mouthpiece preserved.

4,124,523

SILICONE-CONTAINING ACIDIC CLEANER AND CONDITIONER

Robert D. Johnson, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Mar. 7, 1977, Ser. No. 775,080

Int. Cl.[2] C11D *1/66, 3/14, 7/08;* C23G *1/02*

U.S. Cl. 252—145 8 Claims

1. An aqueous cleaning and conditioning composition consisting essentially of

(a) from 0.1 to 10 weight percent, based on the weight of the composition, of a polydimethylsiloxane fluid having a viscosity of from 0.05 to 200 pascal-seconds at 25° C.,

(b) from 10 to 50 weight percent, based on the weight of the composition, of an abrasive,

(c) a colloidal silica,

(d) a non-ionic surfactant in sufficient amount to flocculate the colloidal silica,

(e) sufficient acid to provide a pH of less than 4.0 for said composition and

(f) the balance water, the weight ratio of the total amount of water to the total amount of colloidal silica plus non-ionic surfactant having a value of less than approximately 15.

4,124,524

NEODYMIUM ULTRAPHOSPHATES AND PROCESS FOR THEIR PREPARATION

Hans-Günter Danielmeyer, Hofingen; Jean-Pierre Jeser; Walter W. Krühler, both of Stuttgart; Erich Schönherr, Warmbronn, and Gunter Huber, Gerlingen, all of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Göttingen, Germany

Continuation of Ser. No. 495,172, Aug. 6, 1974, abandoned. This application Sep. 20, 1976, Ser. No. 724,799

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1973, 2342182; Jan. 9, 1974, 2400911; Jan. 26, 1974, 2414513

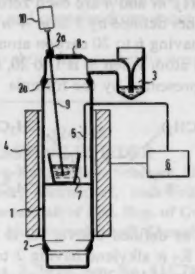
Int. Cl.[2] H01S *3/16*

U.S. Cl. 252—301.1 R 13 Claims

1. Process for the preparation of compounds having the formula

$$Me_xNd_{1-x}P_5O_{14}$$

in the form of untwinned crystals wherein Me represents scandium, gallium, yttrium, indium, lanthanum, cerium, gadolinium lutetium, thallium and/or uranium, and x is a number between 0 and 0.999, which comprises heating Nd_2O_3 and Me_2O_3 in a vessel consisting of fine gold or of an inert, dense, carbon-base material in a closed system having a zone which is held at a lower temperature with an excess of high-purity, anhydrous



normal or heavy phosphoric acid or diphosphoric or polyphosphoric acid, the deuterium being able to be wholly or partially replaced by tritium, with the proviso that a deuteriated or tritiated acid must be used if $x \times 0$, at a temperature between about 500 and 600° C., regulating the crystal growth by regulating the vapor pressure during crystal growth until the desired crystal size is achieved and then separating excess phosphoric acid or polyphosphoric acid, as the case may be.

4,124,525

PROCESS FOR WORKING UP URANIUM-THORIUM WASTES

Paul Börner, Freigericht, and Hans-Jörg Isensee, Bruchköbel, both of Germany, assignors to Nukem GmbH, Hanau, Germany

Filed Jan. 17, 1977, Ser. No. 760,146

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1976, 2601912

Int. Cl.[2] G21F *9/30*

U.S. Cl. 252—301.1 W 5 Claims

1. A process for working up waste consisting essentially of uranium-thorium oxide and returning it without loss into a process for forming kernels of uranium-thorium oxide by casting, comprising dissolving the uranium and thorium containing waste in a strongly acid nitric acid-hydrofluoric acid mixture, evaporating the strongly acid solution until the appearance of nitrogen oxide gas, diluting the hot residue with water and neutralizing the solution to a pH of 2.5 to 3.5 with ammonia at a temperature below 40° C.

4,124,526

ENCAPSULATION PROCESS AND RESULTING AQUEOUS DISPERSION OF ENCAPSULATED DROPLETS

Pierre J. Allart, Brussels, and Henri B. May, Overijse, both of Belgium, assignors to Monsanto Company, St. Louis, Mo.

Filed Jun. 13, 1977, Ser. No. 806,219

Claims priority, application United Kingdom, Jun. 16, 1976, 24971/76

Int. Cl.[2] B01J *13/02*

U.S. Cl. 252—316 9 Claims

1. A process for the encapsulation of oil droplets which comprises the steps of:

(a) Forming a dispersion of droplets of the oil in an aqueous alkaline liquid medium containing in solution an alkali metal salt of a polycarboxylate polymer; said alkali metal salt having been prepared by contacting an ethylene/-maleic anhydride copolymer with an aqueous solution of an alkali metal hydroxide and an alkylamine or alkenylamine of up to 6 carbon atoms, a cycloalkylamine having 5 or 6 ring carbon atoms, a polyamine of the formula

$$H_2N(CHRCH_2NH)_nCHRCH_2NH_2$$

where R is hydrogen or methyl and n is an integer from 1 to 4;

or a diamine of the formula

$$H_2N(CH_2)_mNH_2$$

where m is an integer from 2 to 8;

using a molar ratio of hydroxide to amine of from 3:5 to 5:3 and a combined quantity of hydroxide and amine which is from 80 to 120% of the stoichiometric quantity required for opening of the anhydride rings of the ethylene/maleic anhydride copolymer to form pendant alkali metal carboxylate and carboxylic amide groups; and

(b) Acidifying the aqueous liquid medium to a pH in the range 5 to 8 while maintaining the droplets in dispersion, whereby polycarboxylate polymer is precipitated to form walls around the droplets.

9. An aqueous dispersion of encapsulated oil droplets that has been obtained by a process of claim 1.

4,124,527
COMPOSITIONS AND PROCESS FOR LIQUID SCINTILLATION COUNTING

Joel M. Kauffman, Sharon, Mass., assignor to New England Nuclear Corporation, Boston, Mass.

Division of Ser. No. 420,633, Nov. 30, 1973, Pat. No. 3,939,094. This application Dec. 15, 1975, Ser. No. 640,630

Int. Cl.[2] **C09K** *3/00*

U.S. Cl. 252—408 **11 Claims**

1. A liquid scintillation counting composition, comprising a radioimmunoassay sample and a material having the following structural formula:

$$HO-[CH_2-CH_2-O]_x-CH(CH_3)-CH_2-O]_y-]CH_2CH_2-O]_z-H$$

in which y is from about 18 to about 50, and x and z are such that the total $[CH_2—CH_2—O]$ content is from about 10% to 30% by weight of the molecule.

4,124,528
PROCESS FOR REGENERATING ADSORBENTS WITH SUPERCRITICAL FLUIDS

Michael Modell, Cambridge, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Oct. 4, 1974, Ser. No. 512,124

The portion of the term of this patent subsequent to Dec. 6, 1994, has been disclaimed.

Int. Cl.[2] **B01J** *21/20, 1/09;* **B01D** *15/06*

U.S. Cl. 252—411 R **24 Claims**

1. A process for regenerating an adsorbent by extracting adsorbate therefrom, comprising the steps of

(a) contacting with a supercritical fluid an adsorbent with adsorbate adsorbed thereon from a solution of said adsorbate, said supercritical fluid being a solvent for said adsorbate thereby to desorb a substantial amount of said adsorbate and to dissolve it in said supercritical fluid, the temperature of said supercritical fluid during said contacting being no greater than about 50° C. above its critical temperature and the pressure being above its critical pressure;

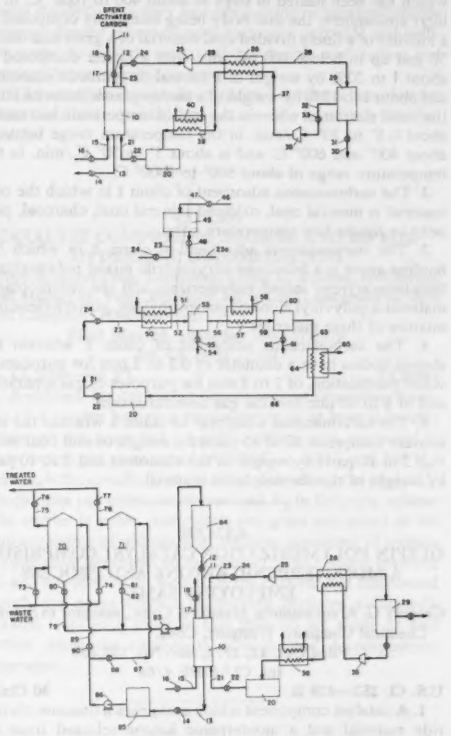
(b) separating said supercritical fluid with said dissolved adsorbate from said adsorbent, thereby to render said adsorbent capable of adsorbing an additional quantity of said adsorbate;

(c) subjecting said supercritical fluid containing said adsorbate dissolved therein to physical treatment which renders said fluid a nonsolvent for said adsorbate thereby to form a two-phase system comprising said fluid in a nonsolvent state and said adsorbate;

(d) separating the resulting two-phase system into nonsolvent state fluid and adsorbate; and

(e) subjecting said nonsolvent state fluid subsequent to said separating step to a physical treatment which converts it to a solvent state supercritical fluid making it a solvent for said adsorbate.

13. In a process for treating waste water in which at least one organic impurity is adsorbed on an adsorbent from said waste water and said adsorbent is periodically regenerated by removing said impurity therefrom, the improvement comprising regenerating said adsorbent by contacting said adsorbent having said impurity adsorbed thereon with a supercritical fluid which is a solvent for said impurity thereby to desorb a substantial amount of said imputity and to dissolve said impurity in said supercritical fluid and to render said adsorbent capable of again adsorbing said impurity from waste water.



22. A process for removing an adsorbate from an adsorbent subsequent to the adsorption of said adsorbate on said adsorbent from a solution of said adsorbate, characterized by contacting said adsorbent with said adsorbate adsorbed thereon with carbon dioxide in a supercritical state thereby to desorb a substantial amount of said adsorbate and to dissolve it in said supercritical carbon dioxide whereby said adsorbent is rendered capable of adsorbing an additional quantity of said adsorbate, said supercritical carbon dioxide during said contacting being at a temperature which is no greater than 50° C. above its

critical temperature and at a pressure above its critical pressure.

4,124,529

CARBONACEOUS ADSORBENTS AND PROCESS FOR MAKING SAME

Harald Jüntgen; Horst Schumacher; Jürgen Klein; Karl Knoblauch; Hans-Jürgen Schröter; Georg Kölling, all of Essen, and Ingo Romey, Hünxe, all of Fed. Rep. of Germany, assignors to Bergwerksverband GmbH, Essen, Fed. Rep. of Germany

Filed May 27, 1977, Ser. No. 801,384

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1976, 2624663

Int. Cl.[2] C01B *31/10*; B01J *21/18*; C01B *31/02*

U.S. Cl. 252—421 **11 Claims**

1. A carbonaceous adsorbent comprising a shaped coal body which has been heated in steps to about 400 to 1000° C. in an inert atmosphere, the said body being essentially composed of a mixture of a finely divided coal material of a grain size below 50 and up to below 100 microns with a binder composed of about 1 to 20% by weight of a natural or synthetic elastomer and about 1 to 15% by weight of a thermoplastic material other than said elastomer wherein the rate of temperature increase is about 0.5° to 10° C./min. in the temperature range between about 400° and 600° C. and is about 5° to 50° C./min. in the temperature range of about 500° to 1000° C.

2. The carbonaceous adsorbent of claim 1 in which the coal material is mineral coal, oxidized mineral coal, charcoal, peat coke or lignite low temperature coke.

3. The carbonaceous adsorbent of claim 1 in which the binding agent is a butadiene-acrylonitrile mixed polymerizate, butadiene-styrene mixed polymerizate and the thermoplastic material is polyvinyl alcohol, polypropylene, polyethylene or a mixture of these materials.

4. The carbonaceous adsorbent of claim 1 wherein the shaped bodies have a diameter of 0.3 to 3 mm for purposes of water purification, of 2 to 8 mm for purposes of gas separation and of 6 to 10 mm for flue gas desulfurization.

5. The carbonaceous adsorbent of claim 1 wherein the said mixture comprises 80 to 85 parts by weight of said coal material, 5 to 10 parts by weight of the elastomer and 5 to 10 parts by weight of the thermoplastic material.

4,124,530

OLEFIN POLYMERIZATION CATALYST COMPRISING A MONOTERPENIC KETONE AND PROCESS EMPLOYING SAME

Gregory G. Arzoumanidis, Stamford, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 12, 1976, Ser. No. 731,267

Int. Cl.[2] C08F *4/64*

U.S. Cl. 252—429 B **30 Claims**

1. A catalyst component which comprises a titanium trichloride material and a monterpenic ketone selected from the group consisting of saturated monocyclic monoterpenic ketones and bicyclic monoterpenic ketones, said monoterpenic ketone being present in an amount from about 2% to about 15% by weight of said titanium trichloride material.

4,124,531

CATALYTIC COMPOSITE FOR THE TREATMENT OF SOUR PETROLEUM DISTILLATES

Robert R. Frame, Glenview, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 3, 1977, Ser. No. 756,578

Int. Cl.[2] B01J *31/22*

U.S. Cl. 252—428 **10 Claims**

1. A catalytic composite for the treatment of sour petroleum distillate comprising a solid adsorptive support impregnated with from about 0.1 to about 25 wt. % polynuclear aromatic sulfonic acid and from about 0.1 to about 10 wt. % metal phthalocyanine in which the metal is selected from the group consisting of magnesium, titanium, hafnium, vanadium, tantalum, molybdenum, maganese, iron, cobalt, nickel, platinum, palladium, copper, silver, zinc and tin.

4,124,532

CATALYSTS FOR POLYMERIZING OLEFINS

Umberto Giannini; Enrico Albizzati, both of Milan; Sandro Parodi, Oleggio (Novara), and Franco Pirinoli, Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 26, 1976, Ser. No. 670,951

Claims priority, application Italy, Mar. 28, 1975, 21815 A/75

Int. Cl.[2] C08F *4/64*, *4/68*

U.S. Cl. 252—429 B **42 Claims**

1. Components of catalysts useful to polymerize olefins having the general formula

$$M_mM'X_{2m}Y.nE$$

in which

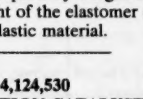
M is at least one metal selected from the group consisting of Mg, Mn and Ca;

m is a number from 0.5 to 2;

M′ is at least one metal selected from the group consisting of Ti, V and Zr;

X is Cl, Br or I;

Y is a radical selected from the group consisting of halogen, $-NR_2$, —OR, and



in which R is a hydrocarbon radical, and mixtures thereof, said radicals R being present in an amount to satisfy the valence of the metal M′;

n is a number from 0.5 m to 20 m; and

E is a hydrocarbyl electron-donor compound selected from the group consisting of

(a) esters of organic carboxylic acids,

(b) amines,

(c) esters of carbonic acid,

(d) nitriles,

(e) phosphoramides,

(f) esters of phosphoric acid,

(g) esters of phosphorus acid, and

(h) phosphorus oxychloride.

4,124,533

METAL COORDINATION COMPLEXES CONTAINING OPTICALLY ACTIVE PHOSPHINE OR ARSINE LIGANDS

William S. Knowles, St. Louis, and Milton J. Sabacky, Ballwin, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 122,116, Mar. 8, 1971, which is a continuation-in-part of Ser. No. 36,471, May 11, 1970, abandoned, which is a continuation-in-part of Ser. No. 758,603, Sep. 9, 1968, abandoned. This application Mar. 17, 1975, Ser. No. 559,200

Int. Cl.[2] C07F *15/00*

U.S. Cl. 252—431 P **15 Claims**

1. An optically active metal coordination complex of the formula $M^1X_nL_3$ wherein M^1 is rhodium, X is selected from the group consisting of hydrogen, chlorine, fluorine, bromine and iodine, *n* is one of the integers one or three; each L is a phosphine or arsine ligand, provided that at least one L group is optically active.

7. A catalyst comprising a solution of a metal selected from the group consisting of rhodium, iridium, ruthenium, osmium, palladium and platinum and at least one equivalent of a phosphine or arsine ligand per mole of metal, provided that the ligand is optically active.

4,124,534

HIGH TEMPERATURE CHLORINATION CATALYST

Frederick C. Leitert, North Madison, and Carl G. Vinson, Jr., Mentor, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Oct. 20, 1976, Ser. No. 734,249
Int. Cl.[2] B01J *27/10;* **C07C** *17/00, 21/02, 21/00*
U.S. Cl. 252—441 **14 Claims**

1. A catalyst for halogenation of olefinic hydrocarbons consisting essentially of cupric chloride modified with at least one modifying metal chloride selected from the group consisting of potassium chloride, magnesium chloride, calcium chloride and barium chloride; impregnated onto an alumina support, said alumina support having an alumina content of from about 96% to about 99% by weight; a silica content of from 0 to about 4.0% by weight; a sodium oxide content of from about 0.2% to about 2.0% by weight, an average particle size of from about 50 to 150 microns, and a surface area of from about 1.0 to about 10 m^2/gm; the total loading of catalyst salts being in the range of from about 3% to about 10% by weight and the atomic ratio of said modifying metal to copper being in the range of from about 0.5:1 to about 1.2:1.

4,124,535

PROCESS FOR MAKING AMPHORA AGGREGATES

Diane G. Farrington, Cleveland, Ohio, and Gilbert K. Meloy, Earlville, Ill., assignors to Standard Oil Company, Cleveland, Ohio

Filed Sep. 8, 1977, Ser. No. 831,456
Int. Cl.[2] B01J *37/00*
U.S. Cl. 252—448 **12 Claims**

1. A process for forming amphora aggregates comprising: dropping droplets of a slurry capable of being chemically gelled or solidified and comprising a suspending liquid and at least one solid suspended in said suspending liquid into a container containing a middle liquid phase capable of chemically gelling or solidifying said slurry, an upper liquid phase above and in contact with said middle liquid phase, and a lower liquid phase below and in contact with said middle liquid phase, the components of said slurry exhibiting substantially no solubility in said upper and lower liquid phases; allowing said droplets to fall in order through said upper liquid phase, said middle liquid phase and said lower liquid phase whereby said droplets partially gel or solidify; recovering the partially gelled or solidified droplet from the lower liquid phase; and drying the agglomerates so obtained.

4,124,536

CATALYST FOR REDUCING NITROGEN OXIDES

Takuji Itoh, Sayama; Satoshi Sakurada, Omiya, and Nobuaki Tagaya, Kawagoe, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 13, 1976, Ser. No. 704,777
Claims priority, application Japan, Jul. 17, 1975, 50-87571
Int. Cl.[2] B01J *29/06;* **F01C** *21/00*
U.S. Cl. 252—455 R **9 Claims**

1. A catalyst for reducing nitrogen oxides contained in exhaust gases, comprising at least one metal component having activity to reduce nitrogen oxides, said metal components being carried on a silica-alumina or a silica-alumina-containing carrier which contains 5 to 50% by weight of silica and which possesses the following properties:

(1) a specific surface area of more than about 300 m^2/g;

(2) a volume of pores having a diameter ranging from 0 to 600 Angstroms less than about 80% of the total volume of pores:

(3) a volume of pores having a diameter ranging from 150 to 600 Angstroms more than about 30% of the volume of pores having a diameter ranging from 0 to 600 Angstroms; and

(4) a bulk density less than about 0.5 grams per milliliter.

6. A catalyst of claim 1 wherein the metal component comprises a metal, a metal oxide or mixtures thereof, said metal selected from the group consisting of copper, chromium, vanadium, iron and mixtures thereof.

4,124,537

COEXTRUDED CATALYTIC COMPOSITE

Stanley A. Gembicki, Western Springs, and Charles L. Morgan, Des Plaines, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Sep. 12, 1977, Ser. No. 832,122
Int. Cl.[2] B01J *23/16, 23/64*
U.S. Cl. 252—465 **12 Claims**

1. A catalytic composite comprising a refractory inorganic oxide-supported Group VIII and Group VIB metal component prepared by the method which comprises coextruding a precursor compound of said Group VIII metal component, a precursor compound of said Group VIB metal component and a finely divided refractory inorganic oxide or inorganic oxide precursor thereof, admixed with hydrogen peroxide and sufficient water to provide an extrudable dough, and drying and calcining the coextruded product.

2. The catalytic composite of claim 1 further characterized in that said finely divided inorganic oxide is a finely divided alumina.

4,124,538

CATALYST COMPRISING IR OR IR AND RU FOR HYDRAZINE DECOMPOSITION

Warren E. Armstrong, Lafayette; Lloyd B. Ryland, El Cerrito, and Hervey H. Voge, Berkeley, all of Calif., assignors to Shell Oil Company, Houston, Tex.

Filed May 28, 1964, Ser. No. 371,879
Int. Cl. B01j *11/08*
U.S. Cl. 252—466 PT **7 Claims**

1. A catalyst for hydrazine decomposition consisting essentially of a carrier having a pore volume of at least 0.1 cubic centimeters per gram and a specific surface area, measured in square meters per gram, equal to 195 $(C_p + 0.013 + 0.736\ V_p)$ where C_p is the specific heat capacity of the carrier at about 25° C. in calories per gram per degree and V_p in the pore volume of the carrier in cubic centimeters per gram and metal of the group consisting of iridium, and mixtures consisting of iridium and ruthenium deposited on said carrier in an amount between 20% and about 40% by weight of the catalyst and distributed through the pores thereof in discrete particles sufficiently separated from each other so that they do not sinter or fuse together when the catalyst is at hydrazine decomposition temperature.

4,124,539

$PB_2[M_{2-x}PB_x]O_{7-y}$ COMPOUNDS WHEREIN M IS RU, IR OR MIXTURES THEREOF, AND METHOD OF PREPARATION

Harold S. Horowitz, Clark; John M. Longo, New Providence, and Joel I. Haberman, Westfield, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Dec. 2, 1977, Ser. No. 856,646
Int. Cl.[2] H01B *1/08*
U.S. Cl. 252—518 **21 Claims**

1. A compound having the formula:

$$Pb_2[M_{2-x}Pb_x]O_{7-y}$$

wherein M is selected from the group consisting of Ru, Ir and mixtures thereof, wherein x is greater than 0 and less than or equal to about 1.2, and wherein y is greater than or equal to 0 and less than or equal to about 1.0.

4,124,540

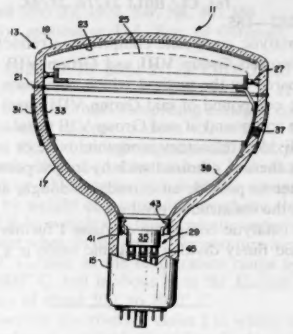
RESISTIVE ELECTRICAL CONDUCTIVE COATING FOR USE IN A CATHODE RAY TUBE

Gordon T. Foreman, Seneca Falls; Anthony V. Gallaro, Auburn, and George N. Williams, Seneca Falls, all of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 739,023, Nov. 4, 1976, abandoned, which is a continuation-in-part of Ser. No. 600,902, Jul. 31, 1975, abandoned. This application Jul. 5, 1977, Ser. No. 813,087

Int. Cl.[2] H01B *1/08*

U.S. Cl. 252—518 **4 Claims**



1. An improved high resistive electrical conductive composition formulated for application to a defined area of the interior surface of a cathode ray tube envelope during tube fabrication to provide an amorphous deposition thereon, said resistive composition comprising a homogeneous mixture of:

substantially 35 to 65 weight percent of a particulate amorphous type vitreous substantially insulative frit material compatible with said tube environment and having a softening point in the temperature range of substantially 350° C. to 450° C., said frit material being comprised principally of substantially 70 to 85 weight percent of PbO, 5 to 15 weight percent of B_2O_3, 2 to 10 weight percent of Al_2O_3, and 3 to 5 weight percent of SiO_2, said frit material having a particle size averaging within the range of substantially 1.0 to 35.0 microns;

substantially 65 to 35 weight percent of at least one particulate material selected from the group consisting essentially of cadmium oxide, indium oxide and copper oxide homogeneously admixed with said frit, said metal oxide ingredients having a distribution of particles averaging within the range of substantially 1.0 to 10.0 microns in size;

binder solids within the range of substantially 0.1 to 0.5 weight percent; and

solvent means for binder solids, said solvent means being compatible with said tube environment and of a quantity to provide a dispersing medium for said mixture and to impart a viscosity thereto of a value within the range of substantially 150 to 1000 centipoise.

4,124,541

DIOXA BICYCLO DODECANE AND -HEXADECANE PERFUME COMPOSITIONS

Jens Conrad, Hilden; Ulf-Armin Schaper, Dusseldorf, and Klaus Bruns, Krefeld, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany

Filed Jun. 15, 1977, Ser. No. 806,616

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1976, 2629000

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 **14 Claims**

1. 10-Methyl-9,12-dioxa-bicyclo-(6,4,0)-dodecane.

4,124,542

SPOT CLEANING COMPOSITION FOR CARPETS AND THE LIKE

Michael J. Devine, 9328 Kessler La., Overland Park, Kans. 66212

Filed Aug. 25, 1977, Ser. No. 827,799

Int. Cl.[2] C11D *3/44, 7/50*

U.S. Cl. 252—546 **6 Claims**

1. An aqueous carpet cleaning composition having active ingredients dispersed in water, said active ingredients comprising on a volume basis:

from about 6 to 10 parts of ammonium lauryl sulfate;

from about 0.5 to 5 parts of a loweralkoxymonohydricloweralcohol;

from about 0.25 to 3 parts of mineral spirits;

from about 0.01 to 0.5 parts of a lowermonohydricalcohol; and

a minor amount of an alkali metal salt of ethylenediaminetetraacetic acid.

4,124,543

ANTI-STATIC AGENT COMPOSITION

Minoru Azuma, Osaka; Junichi Tamura, and Zenichi Mori, both of Wakayama, all of Japan, assignors to Kao Soap Company, Tokyo, Japan

Filed Mar. 6, 1978, Ser. No. 883,926

Claims priority, application Japan, Mar. 11, 1977, 52-27506

Int. Cl.[2] D06M *13/20*

U.S. Cl. 252—8.6 **7 Claims**

1. An aqueous liquid anti-static agent composition for application to the surface of synthetic resin, consisting essentially of:

(a) from 5 to 20 parts by weight of mono- or diester from sucrose and an organic acid having one or more hydrocarbon radicals;

(b) from 4 to 20 parts by weight of mono- or diester from glycerin and an organic acid having one or more hydrocarbon radicals;

(c) from 10 to 30 parts by weight of polyol having molecular weight of from 62 to 10,000;

(d) enough water to make a total composition of at least 100 parts by weight.

4,124,544

METHOD OF PRODUCING AN ACTIVATED CATION-RETAINING SORBENT THROUGH FORMATION OF A MICROCRYSTALLINE PRECIPITATE WHICH ADHERES IN THE PORES AND ON THE SURFACE OF THE SORBENT

Hubert Prochazka, Brno; Karel Stamberg, Prague; Rudolf Jilek, Brno; Pavel Hulak, Ceske Budejovice; Pavel Nemec, Bratislava; Josef Katzer, Prague, and Karel Stastny, Pribram, all of Czechoslovakia, assignors to Ceskoslovenska komise pro atomovou energii, Prague, Czechoslovakia

Division of Ser. No. 520,377, Nov. 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 322,499, Jan. 10, 1973, abandoned. This application Dec. 1, 1975, Ser. No. 636,750

Claims priority, application Czechoslovakia, Jan. 10, 1973, 206-72

Int. Cl.[2] B01D *15/06*; G21F *9/12*

U.S. Cl. 521—26 **2 Claims**

1. In a method of activating a cation-retaining sorbent for use in the purification of waste water containing ions of sulfates, carbonates, bicarbonates and hydroxo groups, the improvement which comprises the steps of contacting a biosorbent selected from the group consisting of type M and type R sorption substances with a regeneration solution selected from the group consisting of iron chloride, lead nitrate, barium chloride, iron nitrate, and calcium chloride, whereby upon a subsequent contact of the resulting activated sorbent with the waste water, the cations in the regeneration solution form, with the anions of the waste water, a microcrystalline precipitate that adheres on the surface and in the pores of the biosorbent.

2. A method as defined in claim 1, in which the waste water contains the cation Ra 226.

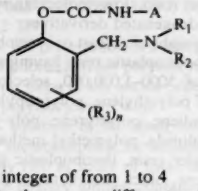
4,124,545

CARBAMIC ACID ESTERS AS CATALYSTS FOR TRIMERIZATION OF ISOCYANATES

Jürgen Hocker, Schildgen; Hans-Joachim Diehr, Wuppertal, and Rudolf Merten, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 705,658, Jul. 15, 1976, abandoned, which is a division of Ser. No. 472,256, May 22, 1974, Pat. No. 3,985,789. This application Jun. 22, 1977, Ser. No. 808,832
Claims priority, application Fed. Rep. of Germany, May 22, 1973, 2325270
Int. Cl.[2] C08G *18/20*
U.S. Cl. 521—129 1 Claim

1. A process for trimerizing a compound having isocyanato groups to form an isocyanurate which comprises heating a compound having isocyanato groups and a catalytic amount of a compound of the general formula



in which

n represents an integer of from 1 to 4

R_1 and R_2 may be the same or different and represent a C_1 to C_6 alkyl group or a polymethylene chain containing 4 to 8 carbon atoms which together with the nitrogen atom form a heterocyclic ring,

R_3 may be hydrogen, chlorine, bromine or a C_1–C_{18}-alkyl group, and

A represents a monovalent group obtained by removing the NCO groups from a monomeric aromatic monoisocyanate containing 6 to 14 carbon atoms, an aliphatic hydrocarbon radical having 1 to 18 carbon atoms, or a cycloaliphatic hydrocarbon radical having 5 to 10 carbon atoms to a temperature above the point where the blocked phenol dissociates into the corresponding phenol.

4,124,546

GREEN STRENGTH OF ELASTOMERS

Diego C. Rubio, Jr., Akron; Richard G. Bauer, Kent, and Richard M. Scriver, Jr., Copley, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 3, 1976, Ser. No. 692,267
Int. Cl.[2] C08L *7/00, 9/00*
U.S. Cl. 260—5 36 Claims

1. A process for improving the green strength of blends having good green strength of elastomers, comprising:

providing an amount of a dimethylbutadiene compound,

providing an amount of an elastomer,

producing a physical and an uncured blend by mixing said dimethylbutadiene compound and said elastomer,

said elastomer selected from the class consisting of natural rubber and synthetic elastomers,

said synthetic elastomers made from monomers selected from the class consisting of at least one conjugated diene having from 4 to 10 carbon atoms, olefins having from 2 to 15 carbon atoms and a diene having from 4 to 10 carbon atoms; and combinations thereof,

said blend having a glass transition temperature of from about 0° C. to about −100° C.,

the amount of said dimethylbutadiene compound ranging from about 5 parts to about 80 parts based upon 100 parts of said blend,

said dimethylbutadiene compounds being an elastomer selected from the class consisting of polydimethylbutadiene, copolymers of dimethylbutadiene, terpolymers of dimethylbutadiene, and tetrapolymers of dimethylbutadiene,

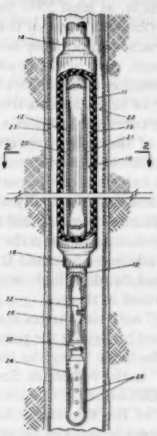
said polydimethylbutadiene made from monomers of dimethylbutadiene, said copolymers, said terpolymers and said tetrapolymers of dimethylbutadiene made from monomers selected from the class consisting of dienes having from 4 to 12 carbon atoms, and vinyl substituted aromatic hydrocarbons having from 8 to 12 carbon atoms, and combinations thereof.

4,124,547

MATERIAL FOR IMPRESSION PACKER

Stanley O. Hutchison, Bakersfield; Glenn W. Anderson, Oildale, and Gordon L. Newby, Bakersfield, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 492,377, Jul. 29, 1974, Pat. No. 3,963,654, which is a division of Ser. No. 373,341, Jun. 25, 1973, Pat. No. 3,885,854. This application Mar. 31, 1976, Ser. No. 672,205
The portion of the term of this patent subsequent to Jun. 15, 1993, has been disclaimed.
Int. Cl.[2] C08L *7/00;* E21B *47/00*
U.S. Cl. 260—5 3 Claims



1. A method of forming an impression sleeve on an impression packer comprising forming a first stage rubber sheet containing natural rubber smoked sheet 50% to 75% by weight, silica powder 10% to 30% by weight, and rubber processing oil 3% to 15% by weight; partially curing an amount of synthetic high nitrile content rubber in the presence of cure chemicals, said nitrile rubber being a butadiene acrylonitrile copolymer and said cure chemicals comprising sulfur, stearic acid and zinc oxide present in an amount from about one-third to three-fourths the amount of said chemicals required for full cure; mixing an amount of the said first stage rubber sheet and the partially cured synthetic nitrile rubber including cure chemicals contained therewith in a predetermined ratio forming a sheet of impression material containing about 60% to 80% by weight partially cured synthetic nitrile rubber including cure chemicals, about 10% to 20% by weight natural rubber smoked sheet, about 5% to 15% by weight silica powder, and about 2% to 6% by weight of rubber processing oil, and connecting said sheet of impression material to a resilient sleeve of an impression packer.

4,124,548
MAR-RESISTANT PAINTS

John Gillan, Langwarrin, and Frederick J. Lubbock, Beaumaris, both of Australia, assignors to Dulux Australia Ltd., Melbourne, Australia

Continuation-in-part of Ser. No. 768,627, Feb. 14, 1977, abandoned, which is a continuation-in-part of Ser. No. 569,744, Apr. 2, 1975, abandoned. This application Apr. 6, 1977, Ser. No. 785,298

Claims priority, application Australia, May 1, 1974, PB7409

Int. Cl.[2] C09D *3/18, 3/393, 3/727*

U.S. Cl. 260—17 R 2 Claims

1. A matt paint composition comprising pigment dispersed in a liquid paint vehicle, at least 55% but less than 90% by volume of the non-volatile content of the paint consisting of synthetic polymer beads, said polymer beads consisting essentially of two sets of beads, each set of beads being characterized in that it has a distribution of bead sizes such that a graph which plots particle size of beads against frequency of occurrence of a given bead size takes the form of a bell-shaped distribution curve, the peak of the curve representing the frequency of occurrence of the most frequently occurring bead size lying between the two extremes of the particle size range for each set, the first set consisting essentially of polymer particles in the size range 2–10 micron diameter and the second set consisting essentially of polymer particles in the size range 10–40 micron diameter, said beads being selected from the group consisting of clear beads and beads which are white and opaque and further characterized in that:

(a) said beads of both size ranges are white and opaque when a film obtained by drying the paint has a reflectance above 65% the reflectance being the standard green reflectance denoted "G" in the American Society for Testing Materials method D2244-68;

(b) said beads of the size range from 2 to 10 microns are white and opaque and the large beads are clear when a film obtained by drying the paint has a reflectance as hereinabove defined from 30% to 65%; (c) said beads of both size ranges are clear when a film obtained by drying the paint has a reflectance as hereinabove defined below 30%.

4,124,549
CORROSION-INHIBITING PLASTIC FILMS

Keinichi Hashiudo, and Kanji Imanishi, both of Toyohashi, Japan, assignors to Aicello Chemical Co., Ltd., Toyohashi, Japan

Filed Aug. 13, 1975, Ser. No. 604,109

Claims priority, application Japan, Aug. 22, 1974, 49-95512

Int. Cl.[2] C23F *11/14*

U.S. Cl. 260—18 N 8 Claims

1. A method for producing a corrosion-protective packaging material comprising:

admixing a thermoplastic resin, an acid, and an organic monoamine to form a uniform blend; and

molding or extruding said blend at a temperature sufficient to cause said acid and said organic monoamine to react together to form a dispersion of a volatile corrosion inhibitor within said thermoplastic resin, thereby forming a corrosion-protective packaging material.

4,124,550
CLAY PIGEON

Takashi Kobayashi, and Sakuya Iwai, both of Tokyo, Japan, assignors to Nippon Oil Co., Ltd., Japan

Filed Jun. 17, 1976, Ser. No. 696,919

Claims priority, application Japan, Jun. 20, 1975, 50-75333; Jun. 27, 1975, 50-79790; Oct. 14, 1975, 50-123701

Int. Cl.[2] C08L *91/00*

U.S. Cl. 260—23.3 3 Claims

1. A clay pigeon for use as a target in trapshooting or skeet-shooting molded from a composition comprised of:

60 to 100 parts by weight of at least one member of low molecular weight thermoplastic resin having an average molecular weight of 300–3000 and a softening point, determined by the ring and ball method, of 60°–200° C, selected from the group consisting of petroleum resin, rosin, rosin esters, polyterpene resin, xylene resin, coumaron-indene resin, low molecular weight polystyrene and their hydrogenated derivatives;

0–40 parts by weight of at least one member of high molecular weight thermoplastic resin having an average molecular weight of 5000–1,000,000, selected from the group consisting of polyethylene, polypropylene, poly-butene-1, 1-2 polybutadiene, polystyrene, poly-oc-methyl styrene, polyvinyl chloride, polymethyl methacrylate, polyamide resin, polyester resin, thermoplastic polyurethane, ethylene-propylene block copolymer, ethylenevinylacetate copolymer, ethylene-ethylacrylate copolymer, styrene-butadiene block copolymer and styrene-isoprene block copolymer; and

100–900 parts by weight of inorganic powdered filler per 100 parts of the total amount of the low molecular weight and high molecular weight thermoplastic resins.

4,124,551
ALIPHATIC HYDROCARBON SOLVENT REDUCIBLE ACRYLIC ENAMEL OF IMPROVED QUALITY

John Mathai, Chicago, and Thomas W. Druetzler, Riverdale, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Sep. 26, 1977, Ser. No. 836,336

Int. Cl.[2] C09D *3/74, 3/80*

U.S. Cl. 260—23 AR 5 Claims

1. Fast-drying, aliphatic hydrocarbon solvent soluble polyacrylic enamel vehicle binders prepared by initially polymerizing from about 5% to less than 30% by weight of glycidyl methacrylate, from about 15% to about 75% by weight of a drying oil fatty acid containing moiety, from about 35% to 75% by weight of one or more alkyl acrylates and/or hydroxy alkyl acrylates and from 5% to 50% by weight of an isobornyl acrylate or isobornyl methacrylate to from an initial polymer and thereafter interpolymerizing therein from about 1% to 100% by weight thereof of a polymerizable monomer consisting essentially of styrene.

4,124,552
WATER SOLUBLE, HIGH SOLIDS URETHANE COATING COMPOSITIONS

Joseph V. Koleske, Charleston, and Oliver W. Smith, South Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,277

Int. Cl.[2] C08L *67/02, 75/06, 75/12*

U.S. Cl. 260—29.2 TN 12 Claims

1. A water based high solids urethane coating composition comprising:

(a) an aliphatic polyisocyanate,

(b) a water soluble, carboxyl modified oligomer addition

reaction product mixture of the reaction of a polycaprolactone polyol and an intramolecular anhydride of a polycarboxylic acid, wherein said polycaprolactone polyol has at least two hydroxyl groups in the molecule, a hydroxyl number of from 15 to 600 and an average molecular weight of from 290 to about 6,000, and wherein said anhydride has at least one intramolecular carboxylic anhydride group and an inorganic or organic base in an amount sufficient to neutralize the free carboxyl groups of said-addition reaction product mixture, and

(c) water.

4,124,553

METHOD FOR THE PREPARATION OF A COMPOSITION CONTAINING POLYCARBAMOYL SULPHONATES FROM POLYISOCYANATES

Geoffrey B. Guise, Highton, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Australia

Filed Dec. 2, 1976, Ser. No. 746,729
Claims priority, application Australia, Dec. 5, 1975, 4203/75
Int. Cl.[2] C08J *3/10;* **C08L** *81/08;* **D06M** *13/00*
U.S. Cl. 260—29.2 TN **18 Claims**

1. A method for the preparation of a composition containing polycarbamoyl sulphonates from polyisocyanates which comprises the following steps in the stated order:

Step 1: Mixing a polyisocyanate with

(a) an aqueous solution of an alkali metal or ammonium bisulphite or metabisulphite, or an aqueous solution of a mixture of any two or more of these salts;

(b) one or more tertiary amines containing on average per molecule one or more tertiary amino groups of the type $R^1R^2R^3N$ where R^1, R^2 and R^3 are each alkyl, aryl, or cycloalkyl groups or two or more of the groups R^1, R^2 and R^3 together form alicyclic or aromatic rings; and

(c) at least one water-miscible solvent selected from the group consisting of: lower aliphatic alcohols with from one to six carbon atoms, ethylene glycol, propylene glycol, diethylene glycol, the mono and di ethers of the said glycols with lower aliphatic alcohols with from one to six carbon atoms, dioxan, tetrahydro furan and tetrahydrofuryl alcohol; and

Step 2 Mixing the reaction mixture from Step 1 with at at least one mineral acid or solution thereof; wherein the polyisocyanate is prepared by the reaction of

(d) a compound or mixture of compounds containing on average two or more isocyanate groups per molecule, and

(e) a compound or mixture of compounds with two or more groups selected from one or more of the groups: hydroxyl, thiol, primary amino, secondary amino or carboxylic acid;

and wherein for each mole of isocyanate groups of the polyisocyanate there is at least one mole of bisulphite ion or its equivalent;

and wherein the number of moles of tertiary amino groups in component (b) is not greater than the number of moles in (a) of bisulphite ions or their equivalents.

4,124,554

POST-FORMED AQUEOUS PHENOLIC RESIN DISPERSIONS

John S. Fry, Hillsborough Township, Somerset County, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Feb. 3, 1977, Ser. No. 765,300
Int. Cl.[2] C08L *61/10*
U.S. Cl. 260—29.3 **16 Claims**

1. A process for producing a dispersion of a solid, substantially water-insoluble, phenolic resin in water, which process comprises subjecting a mixture of:

(a) a pre-formed, solid, substantially waterinsoluble phenolic resin;

(b) water;

(c) a water miscible organic coupling solvent in an amount from about 15 to about 30 volume percent based upon the volume of water plus coupling solvent; and

(d) a polyvinyl alcohol that is hydrolyzed to an extent of from about 85 to about 91 percent in an amount of from about 5¼ to about 13 weight percent based upon the weight of phenolic resin plus polyvinyl alcohol, to shearing agitation at a temperature and for a period of time sufficient to produce a stable dispersion of said phenolic resin in water.

4,124,555

WATER REDUCIBLE COATING COMPOSITIONS CONTAINING COPOLYMERS OF VINYL PYRROLIDONE AND UNSATURATED CARBOXYLIC ACID AND CONTAINING A SOLVENT AND A VOLATILE AMINE

Bill B. Gross, Stow, and Michael J. Maximovich, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 10, 1978, Ser. No. 868,257
Int. Cl.[2] C08L *33/02, 39/06*
U.S. Cl. 260—29.6 HN **16 Claims**

1. A film forming water reducible coating composition comprising:

(A) a resin which consists essentially of, based on 100 weight percent of monomeric units within the resin:

(1) from 0 to about 97 percent of at least two acrylate monomers selected from the group consisting of methyl acrylate, ethyl acrylate, 2-ethylhexyl acrylate, lauryl acrylate, 2-ethylhexyl methacrylate, butyl acrylate, isodecyl methacrylate, butyl methacrylate, isobutyl methacrylate;

(2) from 0 to about 95 percent of a monomer selected from the group consisting of styrene, α-methylstyrene, acrylonitrile, vinyl toluene, methyl methacrylate, vinyl chloride and vinylidene chloride;

(3) from about 0.5 to about 5 percent N-vinyl 2-pyrrolidone; and

(4) from about 2 to about 15 percent of an unsaturated carbonyl compound selected from the group consisting of acrylic acid, methacrylic acid, fumaric acid, itaconic acid, maleic acid, and maleic anhydride; with the proviso that total monomeric units must be 100 percent;

(B) a coalescing solvent, and

(C) a volatile amine.

4,124,556

MOULDING COMPOSITION CONTAINING (A) SILANE ADDITIVE (B) IRON OXIDE AND (C) POLYURETHANE RESIN AND METHOD FOR PREPARING SHAPED FOUNDRY PRODUCTS

Robert J. Schafer, and Richard H. Toeniskoetter, both of Worthington, Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Mar. 16, 1977, Ser. No. 778,292
Int. Cl.[2] C08K *3/10, 7/00, 5/13*
U.S. Cl. 260—29.15 B **15 Claims**

1. A molding composition comprising:

(a) an aggregate as a major constituent:

(b) a silane additive having the formula:

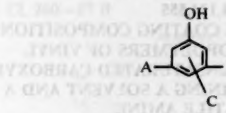
wherein R′ is a hydrocarbon radical and R is an alkyl radical, an alkoxy-substituted alkyl radical, vinyl radical, acryloxy-substituted alkyl radical, epoxy-substituted alkyl radical, glycidoxy-substituted alkyl radical, mercapto-substituted alkyl radical, ureido-substituted alkyl, alkyl amino-substituted alkyl radical, said alkyl radical having

from 1 to 6 carbon atoms; or other organo-functional silane adhesion promoters;

(c) iron oxide in an amount of between about 0.25 and about 5 parts by weight per 100 parts of aggregate; and

(d) up to about 10 parts by weight per 100 parts of aggregate of polyurethane resin binder comprising in admixture:

(1) a resin component comprising an organic solvent solution of a non-aqueous phenolic resin which comprises a condensation product of a phenol having the general formula:



where A, B and C are hydrogen, hydrocarbon radicals, or halogen, with an aldehyde having the general formula R'CHO where R' is a hydrogen on a hydrocarbon radical of 1 to 8 carbon atoms; a hardener component comprising liquid polyisocyanate containing at least two isocyanate groups; and a curing agent comprising a base.

4,124,557

POLYPHOSPHAZENE PLASTICIZED RESINS

Ronald L. Dieck, and Edwin J. Quinn, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

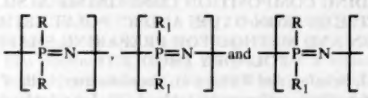
Division of Ser. No. 766,780, Feb. 8, 1977. This application Mar. 23, 1978, Ser. No. 889,534

Int. Cl.[2] C08J *9/10*

U.S. Cl. 260—30.6 R **25 Claims**

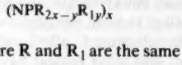
1. A plasticized fire-retardant, low-smoking composition comprising

(a) a phosphazene homopolymer or copolymer comprising repeating units of the formula



where R and R_1 are the same or different and are halogen, amino, C_1 to C_{10} dialkylamino, C_1 to C_{10} alkylamino, C_6 to C_{14} arylamino, C_6 to C_{14} diarylamino, C_1 to C_{18} linear or branched alkyl, C_2 to C_{18} linear or branched alkenyl, C_1 to C_{18} alkoxy, C_6 to C_{14} aryl, C_6 to C_{14} aryloxy, substituted C_1 to C_{18} linear or branched alkyl, substituted C_2 to C_{18} linear or branched alkenyl, substituted C_1 to C_{18} alkoxy, substituted C_6 to C_{14} aryl, or substituted C_6 to C_{14} aryloxy, the substituents selected from the group consisting of chlorine, bromine, nitro, cyano, alkoxy, aryloxy, alkenyl, amino, C_1 to C_{10} alkylamino, C_1 to C_{10} dialkylamino, C_6 to C_{14} arylamino, C_6 to C_{14} diarylamino, or mixtures thereof; and

(b) a compatible cyclophosphazene of the formula



where R and R_1 are the same as above, x is at least 3, and $y \leqq 2x$.

4,124,558

ALKYL 9,9(10,10)-BIS(ACYLOXYMETHYL)OCTADECANOATES AS PRIMARY PLASTICIZERS FOR POLYVINYLCHLORIDE

William R. Miller, and Everett H. Pryde, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

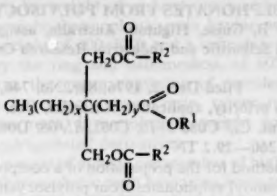
Division of Ser. No. 764,113, Jan. 31, 1977, Pat. No. 4,093,637. This application Mar. 7, 1978, Ser. No. 884,323

Int. Cl.[2] B01F *9/00, 15/02*

U.S. Cl. 260—31.6 **13 Claims**

1. A method of preparing a plasticized polyvinylchloride composition comprising the following steps:

a. providing a primary plasticizer compound having the following general structure:



where

R^1 = C_1–C_8 straight or branched alkyl;

R^2 = C_1–C_4 straight or branched alkyl or halogen-substituted alkyl;

x = 7 or 8; and

y = 7 or 8 with the proviso that

$x + y$ = 15; and

b. fusing a plasticizing amount of the compound described in step (a) with polyvinylchloride.

4,124,559

COMPACTION OF PULVERIZED RUBBER MIXTURES

Heinrich Koch, Siegburg, and Josef Lehnen, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 622,237, Oct. 14, 1975. This application Apr. 11, 1977, Ser. No. 786,471

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1976, 2616666

Int. Cl.[2] C08K *5/01*

U.S. Cl. 260—33.6 AQ **1 Claim**

1. A method for the compaction of a vulcanisable rubber mixture consisting of rubber and additives including a vulcanising medium in the form of a pourable powder having a particle size of from 0.1 to 6 mm and a density of from 0.4 to 0.8 g/cm^3, wherein the mixture is passed through a continuously decreasing cross-section at a temperature of from 0° to 60° C., whereby a granular, compact, yet not completely homogeneous mixture having a density of from 1.1 to 1.4 g/cm^3 is produced.

4,124,560

TWO-COMPONENT SILICONE RUBBER

Joachim Herzig, Leichlingen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 3, 1977, Ser. No. 821,444

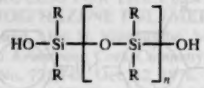
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1976, 2638452

Int. Cl.[2] C08L *83/04*

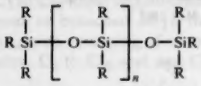
U.S. Cl. 260—37 SB **5 Claims**

1. A vulcanized silicone rubber produced by mixing and vulcanizing a two-component system, component I consisting essentially of

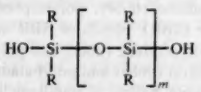
(a) about 20 to 100 parts by weight of a linear organopolysiloxane of the formula



in which
R each independently is a monofunctional hydrocarbon radical, and
n is a positive integer of a value such that the viscosity amounts to between about 500 and 1,000,000 cP at a temperature of 25° C.,
(b) 0 to about 50 parts by weight of a linear organopolysiloxane of the formula



in which
n is a positive integer of a value such that the viscosity amounts to between about 5 and 1,000 cP at a temperature of 25° C.,
(c) 0 to about 20 parts by weight of a linear organopolysiloxane of the formula



in which
R and n are as defined above,
m is a positive integer of a value such that the viscosity amounts to between about 2 and 50 cP at a temperature of 25° C.,
(d) about 10 to 50 parts by weight of a very finely divided pyrogenic silica with a specific surface area according to BET of at least about 50 m^2/g, and
(e) 0 to about 100 parts by weight of another filler or pigment,
component I being a mixture obtained by mixing constituents a) and d) in the presence of water and a modifying agent of the formula

$$(R_3Si)_pX$$

in which
R and n are as defined above,
p is 1 or 2,
X is OH, OR, halogen, S, OOCR, NH, NH_2, NHY, NY or NY_2, and
Y is a monofunctional hydrocarbon radical, and subsequently adding the constituents (b), (c) and (e), and component II consisting essentially of
(f) about 20 to 50 parts by weight of a silicic acid ester of the formula

$$(RO)_3SiR'$$

in which
R is as defined above,
R' is an alkyl or alkoxy radical with up to 6 carbon atoms,
(g) about 1 to 20 parts by weight of a catalytically active heavy metal compound, and
(h) 0 to about 50 parts by weight of a monohydric aliphatic alcohol of the formula

$$(R-(CH_2)_a-OH$$

in which
R is as defined above, and
a is an integer from 1 to about 10.

4,124,561

REINFORCED THERMOPLASTIC POLYESTER COMPOSITIONS HAVING IMPROVED SHATTER RESISTANCE

Donald L. Phipps, Jr., Mt. Vernon, and Allen D. Wambach, Evansville, both of Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 6, 1976, Ser. No. 747,473
Int. Cl.[2] C08K *3/34, 3/40*
U.S. Cl. 260—40 R **18 Claims**

1. A reinforced, shatter-resistant thermoplastic composition comprising:
(a) a high molecular weight polyester resin; and
(b) a reinforcing agent therefor comprising (i) a mineral reinforcing filler comprising mica, talc or a mixture thereof, and in combination therewith (ii) glass fibers, said reinforcing agent (b) being present in an amount at least sufficient to reinforce the composition and said glass fibers (b)(ii) being present in an amount at least sufficient to provide improved shatter resistance in comparison with a corresponding composition wherein the reinforcing material consists essentially of said mineral filler.

4,124,562

POLYOLEFIN COMPOSITION CONTAINING A NOVEL MODIFIED FILLER

Hiroshi Yui; Kazuhide Hayama, both of Yokkaichi, and Hiroshi Takahashi, Tokyo, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Japan

Continuation-in-part of Ser. No. 660,234, Feb. 25, 1976, abandoned, which is a continuation of Ser. No. 519,770, Oct. 31, 1974, abandoned, which is a continuation of Ser. No. 360,783, May 16, 1973, abandoned. This application May 19, 1977, Ser. No. 798,422
Claims priority, application Japan, Jun. 20, 1972, 47/61571
Int. Cl.[2] C08K *9/04*
U.S. Cl. 260—42.14 **22 Claims**

1. A polyolefin composition comprising a polyolefin resin matrix having incorporated therein a modified filler comprising a particulate frangible filler material having a polymer which is a homopolymer or copolymer of a vinyl monomer bearing polar groups, directly engrafted onto freshly mechanically-exposed surfaces of said filler material, said modified filler being obtained by mixing a frangible filler with said polymer and being carried out so as to fracture the original filler particles to form freshly, exposed surfaces thereof and thus graft said filler onto said polymer, comminuting said filler to a particle size of about 0.5μ to less than 5μ while said filler is mixed with said polymer at a temperature of about 20°–25° C., the initial particle size of said filler being about 5 to 100 times larger than that of the comminuted filler, said comminuting being carried out so as to fracture the original filler particles to form freshly, exposed surfaces thereof and thus graft said filler onto said polymer.

4,124,563

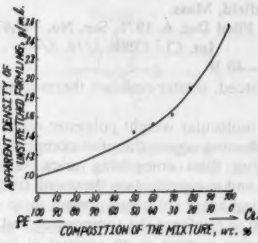
STRETCHED MOLDING COMPOSED OF CALCIUM SULFITE-CONTAINING POLYETHYLENE COMPOSITION AND A PROCESS FOR THE PREPARATION THEREOF

Mitsuo Onozuka; Koki Nomoto, and Kiichi Endo, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kubushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 274,296, Jul. 24, 1972, abandoned. This application Feb. 14, 1977, Ser. No. 768,375
Int. Cl.[2] C08F *45/04*
U.S. Cl. 260—42.24 **2 Claims**

1. A pervious sheet comprising 50–85 wt. % of crystaline

calcium sulfite semi-hydrate, being in the rectangular form and having a short axis of 1–30 μ and a long axis of 5–100 μ and having been prepared by the reaction of sodium or ammonium-bisulfite with calcium carbonate; and 15–50 wt. % of polyolefin, said sheet being stretched at least in one direction to at least 1.5 times the length of its original dimension and having an apparent density: 0.3–1.0; Young's modulus: 100–4,000 kg/cm^2; a tensile strength: 50–700 kg/cm^2; and lower limit of pliability-maintaining temperature: less than −50° C.



2. A process for the manufacture of a pervious sheet, comprising the following steps of: preparing a mixture of 50–85 wt % of calcium sulfite semi-hydrate crystals which are in the rectangular form and have a short axis of 1–30 μ and a long axis of 5–100 μ and having been prepared by the reaction of sodium or ammonium-bisulfite with calcium carbonate; and 15–50 wt % of polyolefin; calendering such mixture into a sheet; and stretching said sheet at least in one direction to at least 1.5 times the length of the original sheet.

4,124,564

SYNTHETIC RESIN STABILIZER COMPRISING A 2,2,6,6-TETRAMETHYLPIPERIDINE-4-ALCOHOL ESTER AND AN OLIGOMERIC CARBONATE

Motonobu Minagawa, Koshigaya; Naohiro Kubota, and Toshihiro Shibata, both of Urawa, all of Japan, assignors to Argus Chemical Corporation, Brooklyn, N.Y.

Filed Feb. 18, 1977, Ser. No. 769,890
Claims priority, application Japan, Feb. 18, 1976, 51-16793
Int. Cl.^{2} C08K *5/34*
U.S. Cl. 260—45.8 N **24 Claims**

1. A stabilizer composition capable of enhancing the resistance to deterioration of a synthetic resin upon exposure to light of wave length shorter than 400 nanometers and to heat at 150° C., comprising (a) a carboxylic acid ester of an alcohol linked to the 4 position of a 2,2,6,6-tetramethylpiperidine compound having each 2,2,6,6-tetramethylpiperidine ring nitrogen atom substituted with a hydrogen atom or an oxygen radical, and (b) an oligomeric carbonate ester of a polyhydric phenol having 2 to 3 phenolic groups disposed on 1 to 3 benzenoid rings and an average molecular weight between 400 and 4000.

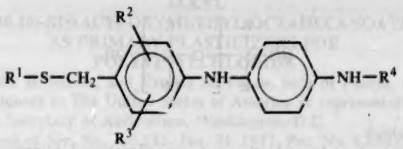
4,124,565

N,N'-DISUBSTITUTED-P-PHENYLENEDIAMINES

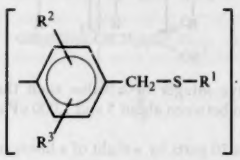
Joseph A. Kuczkowski, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 6, 1977, Ser. No. 803,703
Int. Cl.^{2} C08K *5/36*; C07C *87/62*
U.S. Cl. 260—45.9 QB **5 Claims**

1. A compound having the following structural formula:



wherein R^1 is selected from the group consisting of normal-alkyl radicals (1–20C), aryl radicals (6–14C), substituted normal alkyl radicals (2–20C), substituted aryl radicals (6–14C), and aralkyl radicals (7–15C); R^2 and R^3 are selected from the group consisting of H, alkyl radicals (1–8C), aryl radicals (6–C), aralkyl radicals (7–15C), and halogen radicals; and R^4 is selected from the group consisting of alkyl radicals (1–18C), aryl radicals (6–14C) and



3. A polymer selected from the group consisting of natural rubber, polybutadiene rubber, polyisoprene rubber, styrene butadiene rubber (SBR), blends of SBR and natural rubber, blends of SBR polyisoprene rubber and polybutadiene rubber, and blends of natural rubber and polybutadiene rubber having incorporated therein having a stabilizng amount of a compound of claim 1.

4,124,566

PROCESS FOR PREPARING POLYESTERS

Noritsugu Saiki; Shizuka Kurisu, and Shoji Kawase, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jun. 15, 1977, Ser. No. 806,879
Claims priority, application Japan, Jun. 16, 1976, 51-69717; Dec. 9, 1976, 51-147082
Int. Cl.^{2} C08G *63/18, 63/22, 63/26, 63/28*
U.S. Cl. 528—177 **20 Claims**

1. A process for preparing polyesters, which comprises

(1) a first step of esterifying at a temperature of 200°–350° C. and a pressure of 1 to 15 kg/cm^2, (A) a difunctional carboxylic acid containing at least 60 mole% of an aromatic dicarboxylic acid, (B) 0 to 80 mole%, based on component (A), of a material selected from the group consisting of an aliphatic diol, a dihydroxybenzene or mixtures thereof and (C) an aromatic monohydroxy compound in an amount of at least 210 mole% as a total of it and component (B) based on component (A), the esterification being performed until the degree of esterification reaches at least 80%,

(2) subsequently, a second step of adding 0 to 80 mole%, based on component (A), of component (B) and a bisphenol (D) in an amount of 100 to 130 mole% as a total of it and component (B) based on component (A) to the reaction product obtained in the first step and reacting the mixture at a temperature of 200° to 400° C. and at a pressure of 760–0.001mHg, the total amount of components (B) used in the first and second steps being 0 to 80 mole% based on component (C), and

(3) performing at least the first of the above steps in the presence of an aromatic hydrocarbon medium having a boiling point of 105° to 175° C. at normal atmospheric pressure and being inert at the reaction temperature.

4,124,567

CATALYTIC PROCESS FOR THE PREPARATION OF PHOSPHAZENE POLYMERS

Ronald L. Dieck, and Alan B. Magnusson, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Division of Ser. No. 731,745, Oct. 12, 1976. This application Apr. 10, 1978, Ser. No. 895,259

Int. Cl.[2] C08J *9/06*

U.S. Cl. 528—168 12 Claims

1. A process for forming a phosphazene polymer which is substantially free of halogen which process comprises:

(a) thermally polymerizing a cyclic compound of the formula $(NPCl_2)_y$ wherein y is 3, 4, or mixtures thereof with a catalytically sufficient amount of a compound having the formula $M(OR')_x$, wherein M is an alkali metal or an alkaline earth metal, x is equal to the valence of the metal M, and R′ is C_1 to C_{10} linear or branched alkyl, C_1 to C_{10} substituted linear or branched alkyl, the substituent selected from the group consisting of nitro, C_1 to C_{10} alkyl, C_1 to C_{10} alkoxy, C_6 to C_{10} aryl and C_6 to C_{10} aryloxy radicals; and

(b) contacting the resulting phosphazene polymer with a metal compound having the formula

$M(OC_6H_4R_1)_x$,

$M(OC_6H_4R_2)_x$, or mixtures thereof

wherein M is an alkali metal or alkaline earth metal, x is equal to the valence of said metal M, and R_1 and R_2 are the same or different and are selected from the group consisting of C_1 to C_{10} alkyl radical, C_6 to C_{10} aryl radical, C_1 to C_{10} substituted C_1 to C_{10} alkyl radical and substituted C_6 to C_{10} aryl radical, the substituent selected from the group consisting of halogen, nitro, cyano, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, C_6 to C_{10} aryl and C_6 to C_{10} aryloxy radicals.

4,124,568

POLYCONDENSATES

Wilfried Zecher; Willi Dünwald, and Rudolf Merten, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Germany

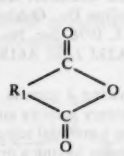
Filed Nov. 23, 1977, Ser. No. 854,112

Claims priority, application Fed. Rep. of Germany, Nov. 29, 1976, 2654112

Int. Cl.[2] C08G *63/52*

U.S. Cl. 528—59 12 Claims

1. Processes for the production of a polycondensate linked through five membered nitrogen containing rings, wherein unsaturated cyclic carboxylic acid anhydride compounds corresponding to the general formula:



in which R_1 represents a mono-unsaturated organic radical, is reacted with a monofunctional or polyfunctional aliphatic, aliphatic-aromatic or aromatic alcohol and a polyfunctional organic isocyanate at a temperature in the range from 0° C. to 500° C.

4,124,569

PROCESS FOR THE PREPARATION OF POLYISOCYANATES CONTAINING URETHANE AND BIURET GROUPS

Manfred Bock, Leverkusen; Josef Pedain, Cologne; Walter Uerdingen, Bergisch-Gladbach, and Manfred Schönfelder, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Germany many

Filed Sep. 12, 1977, Ser. No. 832,318

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1976, 2641448

Int. Cl.[2] C08G *18/79*

U.S. Cl. 528—61 16 Claims

1. A process for the preparation of polyisocyanates containing urethane and biuret groups and having aliphatically-bound isocyanate groups and an isocyanate functionality greater than 2, comprising reacting aliphatic and/or cycloaliphatic diisocyanates in an at least 4-times molar excess with compounds of the formula

$$(H_2N)_n + X \rightarrow_o R + OH)_m$$

wherein

o represents 0 or 1,

m represents 1 or 2 when $o = 0$ and represents 1 when $0 = 1$,

n represents 1 or 2 when $o = 0$ and represents 1 when $o = 1$, such that the sum of $n + m$ is always 2 or 3,

R either

(a) represents a xylylene group when $o = 0$ or

(b) when $o = 0$ it may represent an aliphatic or cycloaliphatic hydrocarbon group having a total of 3–18 carbon atoms which may be interrupted by secondary amino groups —NH—, ether groups —O—, amide groups —NH—CO— or urethane groups —NH—CO—O— in such a manner that at least two carbon atoms are arranged between NH_2 and OH groups, the trimethylene group being excluded, or

(c) when $o = 1$, R represents an aliphatic hydrocarbon group having from 2–10 carbon atoms, at least 2 carbon atoms being arranged between X and the OH group, and

X represents a group —NH—CO—O— or —NH—CO—, the amino group —NH_2 being in each case linked to the nitrogen atom of these groups with formation of the structure of a hydrazine derivative

at a temperature between about 90 and 200° C. and subsequently removing the excess diisocyanate.

4,124,570

POLY(NEOPENTYL TEREPHTHALATE/TRIMELLITATE)THERMOSETTING RESIN

Anthony S. Scheibelhoffer, Norton, and Richard E. Meier, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 10, 1977, Ser. No. 805,365

Int. Cl.[2] C08G *63/18*

U.S. Cl. 528—273 2 Claims

1. Poly(neopentyl terephthalate/trimellitate) thermosetting copolyester resin comprising from 95/5 to 85/15 neopentyl terephthalate/trimellitate formed of neopentyl polyester having an intrinsic viscosity of from about 0.077 to 0.120 (determined by a vibrating reed viscometer) joined by units of trimellitic anhydride, the copolymer having a hydroxyl number of from 30 to 50, an acid number of less than 15, an intrinsic viscosity of about 0.185 and a Tg of not less than 60° C.

4,124,571

THERMOPLASTIC COPOLYESTERS PREPARED FROM AROMATIC DICARBOXYLIC ACID SUBSTITUTED SUCCINIC ACID OR ANHYDRIDE AND A GLYCOL AND THE USE THEREOF IN ADHESIVES

Paul C. Georgoudis, Dunellen, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Aug. 1, 1977, Ser. No. 820,451
Int. Cl.[2] C08L *67/02*
U.S. Cl. 260—16 **15 Claims**

1. A thermoplastic copolymer of

A. at least one aromatic dicarboxylic acid member selected from the group consisting of aromatic dicarboxylic acids and the acid functioning derivatives thereof;

B. at least one aliphatic dicarboxylic acid member selected from the group consisting of substituted succinic acids and the anhydrides thereof, said succinic acids having alkyl or alkenyl C_4–C_{36} group substituents;

C. at least one C_2–C_{10} glycol;

wherin said aromatic and aliphatic dicarboxylic acid members each comprise 20–80 mole percent of the total dicarboxylic acid members; and optionally

D. a non-polymeric polyfunctional member selected from the group consisting of non-polymeric polyols, polycarboxylic acids and hydroxy acids having at least three functional hydroxyl or carboxyl groups and the substituted ester-forming-derivatives thereof.

4,124,572

THERMOPLASTIC POLYURETHANE ELASTOMER

Chung-Ling Mao, Sandy Hook, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Filed Jul. 5, 1977, Ser. No. 813,070
Int. Cl.[2] C08G *18/42, 18/48*
U.S. Cl. 528—76 **5 Claims**

1. A thermoplastic polyurethane elastomer which is a reaction product of:

(a) a poly(oxypropylene)-poly(oxyethylene) glycol of molecular weight from 1000 to 3000 containing 25–60% by weight oxyethylene groups;

(b) a chain extended polyester polyol of molecular weight from 1000 to 3000;

(c) a polyisocyanate selected from the group consisting of 2,4-tolylene diisocyanate, methylenebis (4-phenylisocyanate), 4,4'-diisocyanatodicyclohexylmethane and isophorone diisocyanate; and

(d) a low molecular weight polyol chain extender, the ratio of (a) to (b) being from 10/90 to 90/10 by weight, the molar ratio of (d) to (a) plus (b) being from 3:1 to 10:1 and the NCO/OH equivalence ratio being from 0.95:1 to 1.10:1, said elastomer having a hardness of from 80 Shore A to 55 Shore D, an elongation of greater than 300%, an ultimate tensile length of at least 4,000 psi and a Die C tear Strength of at least 500 pli.

4,124,573

SOFT POLYURETHANE ELASTOMER CONTAINING ISOCYANURATE RING

Yoji Watabe; Michio Ishii, both of Kodaira; Hiroshi Kaneda; Fumitaka Ino, both of Murayama; Masao Kuwano, Kurume; Yasuyuki Ura, Hino, and Shiro Anzai, Murayama, all of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1977, Ser. No. 763,900
Int. Cl.[2] C08G *18/18*
U.S. Cl. 528—53 **23 Claims**

1. A process for preparing a noncellular soft polyurethane elastomer containing isocyanurate rings, which comprises mixing

(a) polyoxypropylene polyol having an OH equivalent molecular weight of about 500–3,000 and a functionality of 2–5;

(b) a polyisocyanate compound, the equivalent ratio (NCO-/OH) of isocyanate groups in the polyisocyanate compound to hydroxyl groups in the polyol being from about 0.95–3.3; and

(c) from about 0.01 to 2.0 parts by weight per 100 parts by weight of the sum of the polyol and polyisocyanate compounds of a tertiary amine catalyst which is N,N-dimethylbenzylamine or N,N-dimethylcyclohexylamine,

and curing the mixture.

4,124,574

POLY (OXYALKYLENE) GLYCOL BASED POLYURETHANE WITH IMPROVED PAINT ADHESION PROPERTIES

Frank J. Preston, Meriden, and David R. MacFarland, Cheshire, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Aug. 29, 1977, Ser. No. 828,380
Int. Cl.[2] C08G *18/48*
U.S. Cl. 528—76 **21 Claims**

1. A polyurethane elastomer with improved paint adhesion properties comprising the reaction product of an organic diisocyanate, a chain extender and a polyether polyol having a molecular weight of about 1,500 to about 3,000 prepared by oxyalkylation of (a) a poly (oxypropylene) glycol precursor which precursor is the condensation product of propylene oxide and a difunctional active hydrogen-containing initiator with (b) a random capping mixture of ethylene oxide and about 3 to about 15 percent by weight propylene oxide to produce a polyether polyol including about 30 to about 60 percent by weight oxyethylene content.

4,124,575

CURABLE COMPOSITION CONTAINING FLUORINE RUBBERS AND AMINO ACIDS

Masao Onizawa, Ohmiya, Japan, assignor to Sanyo Trading Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1977, Ser. No. 789,275
Claims priority, application Japan, Apr. 23, 1976, 51-45439
Int. Cl.[2] C08F *8/32;* C08G *73/02;* C08F *18/00;* C08G *19/46*
U.S. Cl. 526—18 **3 Claims**

1. A curable composition consisting essentially of (a) a fluorine rubber selected from the group consisting of a vinylidene fluoride/hexafluoropropylene copolymer, a vinylidene fluoride/hexafluoropropylene/tetrafluoroethylene copolymer, a vinylidene fluoride/1,2,3,3,3-pentafluoropropylene copolymer, a vinylidene fluoride/chlorotrifluoroethylene copolymer, a trifluoronitrosomethane/tetrafluoroethylene copolymer, a terpolymer of trifluoronitrosomethane, tetrafluoroethylene, and nitrosoperfluoropropionic acid or nitrosoperfluorobutyric acid as a third component, and a polymer of 1,1-dihydroperfluorobutyl acrylate and (b) at least one amino acid selected from the group of arginine, lysine, ornithine, hydroxylysine, glutamine, cystine, asparagine and citrulline, the content of amino acid being 0.1 to 30 parts by weight per 100 parts by weight of the fluorine rubber.

4,124,576

METHOD OF PRODUCING INTRAVENOUSLY INJECTABLE GAMMA GLOBULIN

Myer L. Coval, 6241 Chelton Dr., Oakland, Calif. 94611

Filed Dec. 3, 1976, Ser. No. 747,063
Int. Cl.[2] A23J *1/06;* A61K *37/06*
U.S. Cl. 260—112 B **8 Claims**

1. A process for preparing a gamma globulin substantially devoid of anticomplementary activity and suitable for intravenous administration, from a material selected from the Fraction II + III plasma protein paste having a protein content of about 25–30%, Fraction II paste and placental extracts containing these fractions which comprises the steps:

a. suspending said paste in water to form a solution of low ionic strength having a conductance of about $300 \times 10^{-6} cm^{-1} ohm^{-1}$ at a pH of about 4.9 to 6.0 to produce a precipitate and a filtrate,

b. precipitating impurities from said filtrate by adding polyethylene glycol to 4% weight/volume,
c. further precipitating impurities by the addition of ethanol in a concentration of from 4 to 12% and
d. precipitating the gamma globulin by adding polyethylene glycol to 10 to 12% weight/volume or by adding ethanol to 20 to 30% v/v, preferably 25% at a pH of from 7 to 8.2, preferably 8.0.

said process being carried out at a temperature of about 0° to −6° C.

4,124,577

NONAPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis J. Tinney; Elizabeth A. Lunney, and Ernest D. Nicolaides, all of Ann Arbor, Mich., assignors to Warner-Lambert, Morris Plains, N.J.

Filed Jun. 13, 1977, Ser. No. 805,765
Int. Cl.² C07C *103/52;* A61K *37/00*
U.S. Cl. 260—112.5 LH **3 Claims**

1. A nonapeptide having the name N^{α}-t-butoxycarbonyl-N^{im}-benzyl-L-histidyl-L-tryptophyl-O-benzyl-L-seryl-O-benzyl-L-tyrosyl-D-phenylalanyl-L-leucyl-N^{G}-[(4-methylphenyl)sulfonyl]-L-arginyl-L-prolyl-glycinamide.

4,124,578

ANTIOVULATORY POLYPEPTIDES

Milton Lapidus, Rosemont, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Jan. 3, 1978, Ser. No. 866,727
Int. Cl.² C07C *103/52;* A61K *37/00*
U.S. Cl. 260—112.5 LH **5 Claims**

1. A peptide of the formula:

pGlu-Tyr-Arg-X-Y

wherein:
X is Trp or D-Trp, and
Y is Pro—NHEt or the peptide segment —Gly—X_1—X-$_2$—Arg—Pro—Z, wherein:
X_1 is Ala, D-Ala, or MeAla;
X_2 is Leu or D-Leu; and
Z is —NH_2 or —NHEt,
or the non-toxic pharmaceutically acceptable acid addition salts thereof.

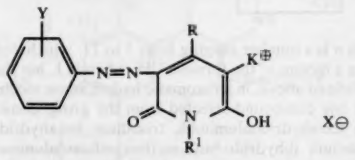
4,124,579

ARYLAZO-HYDROXY PYRIDONE DYES CONTAINING A PYRIDINIUM GROUP

Brian Parton, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Nov. 29, 1976, Ser. No. 745,778
Claims priority, application United Kingdom, Dec. 17, 1975, 51617/75
Int. Cl.² C09B *29/36*
U.S. Cl. 260—156 **2 Claims**

1. An azo dyestuff devoid of carboxylic acid and sulphonic acid groups and of the formula



wherein R is methyl, R^1 is hydrogen or lower alkyl, Y is a group —$OCOR^2$ wherein R^2 is aryl or alkyl or more than 5 carbon atoms, $K^{\oplus}$ is a pyridinium or methyl ring substituted pyridinium group and $X^{\ominus}$ is an anion.

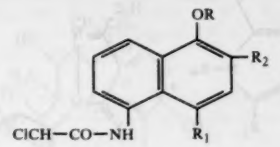
4,124,580

AZO COMPOUNDS OF SULFANILAMIDE DERIVATIVES

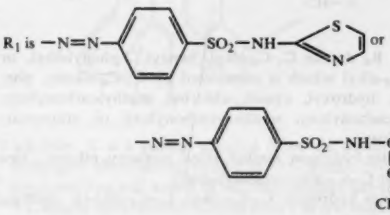
Takeo Takayanagi, 4525 Henry Hudson Pkwy., Bronx, N.Y. 10471

Filed Nov. 17, 1976, Ser. No. 742,625
Int. Cl.² C07C *107/08;* C09B *29/10, 33/10;* A61R *31/655*
U.S. Cl. 260—157 **4 Claims**

1. An azo compound of the formula



wherein R is hydrogen or —CO—$CHCl_2$,



and R_2 is hydrogen or has the same meaning as R_1.

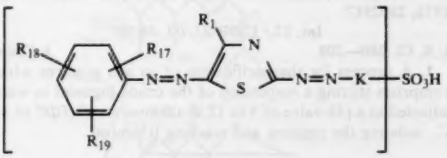
4,124,581

DISAZO DYESTUFFS CONTAINING A THIAZOLE CENTRAL COMPONENT

Dieter Vor der Brück, Bonn, and Gerhard Wolfrum, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

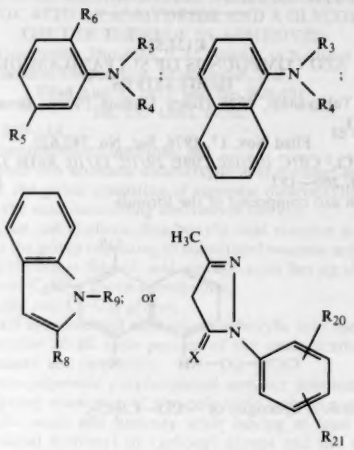
Filed Dec. 16, 1976, Ser. No. 751,359
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1975, 2557410
Int. Cl.² C09B *31/04, 31/08, 31/14;* D06P *3/24*
U.S. Cl. 260—158 **6 Claims**

1. Disazo-thiazole dyestuff, which in the form of the free acid corresponds to the formula



wherein
R_1 denotes hydrogen, methyl, ethyl, phenyl, or phenyl substituted by chlorine, methyl, methoxy, ethoxy or nitro;
R_{17} and R_{18} denotes hydrogen, chlorine, bromine, cyano, C_1-C_4-alkyl, C_1-C_4-alkoxy, trifluoromethyl, phenoxy, C_1-C_4-alkylsulphonyl, phenylsulphonyl, benzylsulphonyl, carboxamide, sulphonamide, mono- or di-substituted carboxamide, or mono- or di-substituted sulphonamide wherein the substituents are C_1-C_4-alkyl, β-hydroxyethyl, benzyl, phenyl or phenethyl;
R_{19} denotes hydrogen, C_1-C_4-alkyl, chlorine or bromine;

K denotes



wherein

R_3 and R_4 denote C_1-C_4-alkyl, benzyl, 2-phenylethyl, or C_1-C_4-alkyl which is substituted by C_1-C_4-alkoxy, phenoxy, hydroxyl, cyano, chlorine, methylcarbonyloxy, ethylcarbonyloxy, methoxycarbonyloxy or ethoxycarbonyloxy;

R_5 denotes hydrogen, methyl, ethyl, methoxy, ethoxy, chlorine or C_1-C_3-alkylcarbonylamino;

R_6 denotes hydrogen, C_1-C_4-alkyl, C_1-C_4-alkoxy, chlorine or bromine;

R_{20} and R_{21} denote hydrogen, C_1-C_4-alkyl, chlorine or bromine;

R_8 denotes hydrogen, C_1-C_4-alkyl, or phenyl; and

R_9 denotes hydrogen, C_1-C_4-alkyl, or C_1-C_4-alkyl substituted by hydroxyl, cyano, carboxyl, or carboxamide.

4,124,582

PROCESS FOR THE PURIFICATION OF AZO PIGMENTS BY STIRRING AN AQUEOUS, ALKALINE SUSPENSION OF CRUDE PIGMENT

Joachim Ribka, Offenbach am Main, and Wolfgang Rieper, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 434,003, Jan. 17, 1974, abandoned. This application Sep. 25, 1975, Ser. No. 616,668

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1973, 2302517

Int. Cl.[2] **C09B** *43/00, 46/00*

U.S. Cl. 260—208 **6 Claims**

1. A process for the purification of an azo pigment which comprises stirring a suspension of the crude pigment in water adjusted to a pH-valve of 9 to 12 at a temperature of 20° to 80° C., isolating the pigment and washing it neutral.

4,124,583

5-SUBSTITUTED DERIVATIVES OF 5H-DIBENZ (b,f)-AZEPINE AND METHOD FOR OBTAINING THE SAME

Atanas G. Georgiev, and Hristo P. Daskalov, both of Sofia, Bulgaria, assignors to DSO "Pharmachim", Sofia, Bulgaria

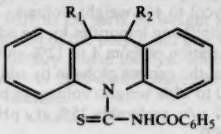
Filed Aug. 19, 1976, Ser. No. 715,792

Claims priority, application Bulgaria, Aug. 20, 1975, 30823

Int. Cl.[2] **C07D** *223/22*

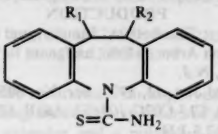
U.S. Cl. 260—239 D **5 Claims**

1. Compounds having the formula (III):



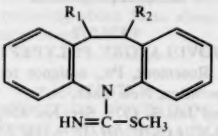
wherein R_1 and R_2 represent substituents selected from the group consisting of hydrogen bonds or carbon to carbon bonds in the 10th and 11th positions of the dibenz(b,f)-azepine.

2. Compounds having the formula (IV):



wherein R_1 and R_2 represent substituents selected from the group consisting of hydrogen bonds or carbon to carbon bonds in the 10th and 11th positions of the dibenz(b,f)-azepine.

3. Compounds having the formula (V):



and their salts formed with hydroiodic acid wherein R_1 and R_2 represent substituents selected from the group consisting of hydrogen bonds or carbon to carbon bonds in the 10th and 11th positions of the dibenz(b,f)-azepine.

4,124,584

PROCESS OF MANUFACTURING SODIUM LACTAMOALUMINATES

Bohuslav Másensky, Prague; Jiří Macháček, Kralupy; Otomar Kříž, Prague, and Vladimír Kubánek, Kralupy, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Dec. 2, 1976, Ser. No. 746,823

Claims priority, application Czechoslovakia, Jul. 1, 1976, 4352-76; Jul. 1, 1976, 4351-76

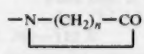
Int. Cl.[2] **C07D** *223/10, 211/86, 207/26*

U.S. Cl. 260—239.3 R **8 Claims**

1. A process of manufacturing sodium lactamoaluminates of the general formula

$$Na\ Al\ (OCH_2CH_2OCH_3)_x\ L_{4-x},$$

wherein x is a number ranging from 0 to 2 and L is a residue derived by splitting off an active hydrogen from a lactam having the formula



wherein n is a number ranging from 3 to 11, which comprises: reacting a lactam of the formula LH, wherein L has the meaning as defined above, in an aromatic hydrocarbon medium with at least one compound selected from the group consisting of sodium tetrahydridoaluminate, trisodium hexahydridoaluminate, sodium dihydrido-bis(2-methoxyethoxo)aluminate, and sodium tetraamidoaluminate, wherein the molar ratio of the lactam to hydride hydrogen or to the NH_2 group in the aforementioned aluminates ranges from 1:1 to 2:1.

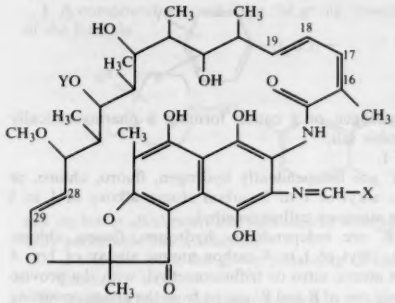
4,124,585

RIFAMYCIN COMPOUNDS

Leonardo Marsili; Vittorio Rossetti, and Carmine Pasqualucci, all of Milan, Italy, assignors to Archifar Laboratori Chimico Farmacologici S.p.A., Rovereto, Italy

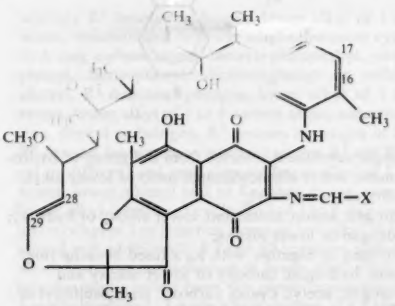
Filed Nov. 3, 1976, Ser. No. 738,352
Claims priority, application Italy, Nov. 12, 1975, 5240 A/75
Int. Cl.[2] C07D *498/08*
U.S. Cl. 260—239.3 P 1 Claim

1. A rifamycin compound having the formula



(I)

wherein: X is a radical selected from the group comprising aromatic hydrocarbon having from 6 to 8 C atoms; aromatic hydrocarbon-alkenyl having 8 C atoms; a heterocyclo selected from the group consisting of thiophene, furan and pyrrole; tetrazole; pyrane; a 5 or 6 member heterocycle condensed with an aromatic hydrocarbon having from 6 to 8 C atoms wherein the heterocycle has 1 or 2 hetero-atoms selected from the group consisting of O and S; substitution products of the above specified radicals having from 1 to 4 radicals differing therefrom and selected from the group consisting of halogen, hydroxyl, alkoxyl having less than 7 C atoms, nitro, amino, N-alkylamino having less than 3 C atoms, N,N-dialkylamino having from 2 to 4 C atoms, carboxyl, carboalkoxy having from 2 to 5 C atoms, carboxyalkoxy having 2 or 3 C atoms, dialkylaminoalkoxy having from 3 to 6 C atoms, acetoxy, acetamido; Y is —H or —$COCH_3$; and its 16, 17, 18, 19 tetrahydroderivatives and 16, 17, 18, 19, 28, 29 **hexahydroderivatives and corresponding oxidized products having the formula**



(II)

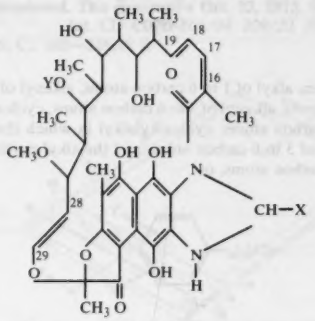
4,124,586

RIFAMYCIN COMPOUNDS

Leonardo Marsili; Vittorio Rossetti, and Carmine Pasqualucci, all of Milan, Italy, assignors to Archifar Laboratori Chimico Farmacologici S.p.A., Rovereto, Italy

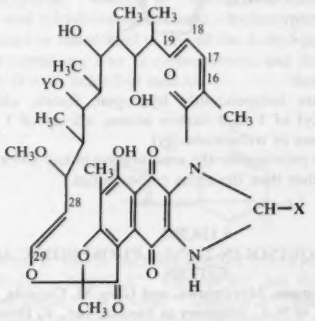
Filed Nov. 3, 1976, Ser. No. 738,358
Claims priority, application Italy, Nov. 12, 1975, 5240 A/75
Int. Cl.[2] C07D *498/18*
U.S. Cl. 260—239.3 P 2 Claims

1. A rifamycin compound having the formula



(I)

wherein: X is a radical selected from the group comprising hydrogen; alkyl having from 1 to 13 C atoms; cycloalkyl having from 3 to 6 C atoms in the ring; alkenyl having from 2 to 5 C atoms; cycloalkenyl having from 5 to 6 C atoms in the ring; aromatic hydrocarbon having from 6 to 12 C atoms; aromatic hydrocarbon-alkyl having from 7 to 13 C atoms; aromatic hydrocarbon-alkenyl having from 8 to 10 C atoms; a 5 and 6 member heterocycle having only 1 heteroatom consisting of an atom N; substitution products of the above specified radicals having from 1 to 4 radicals selected from the group consisting of halogen, hydroxyl, alkoxyl, carboxyl, carboalkoxy, carboxyalkoxy alkanoyloxy, acetamido; Y is —H or —$COCH_3$; and its 16, 17, 18, 19 tetrahydroderivatives and 16, 17, 18, 19, 28, 29 hexahydroderivatives and corresponding oxidized products having the formula



(II)

wherein X and Y are those as defined for formula (I) and also relates to 16, 17, 18, 19 tetrahydroderivatives and 16, 17, 18, 19, 28, 29 hexahydroderivatives for the compounds of formula (II).

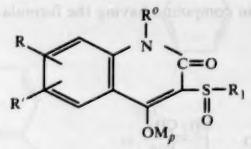
4,124,587

4-HYDROXY-3-SULFINYL-QUINOLIN-2(1H)-ONES

Goetz E. Hardtmann, Morristown, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

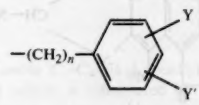
Filed Mar. 1, 1976, Ser. No. 662,705
Int. Cl.[2] C07D *213/71*
U.S. Cl. 546—90 **20 Claims**

1. A compound of the formula:



wherein

R^o is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl portion is of 1 or 2 carbon atoms, or



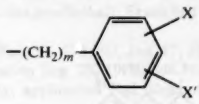
Mp is hydrogen or a cation forming a pharmaceutically acceptable salt,

n is 0 or 1,

Y and Y′ are independently hydrogen, fluoro, chloro, or bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or trifluoromethyl,

R and R′ are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, nitro or trifluoromethyl, with the proviso that only one of R and R′ can be from the group consisting of nitro and trifluoromethyl, or R and R′ together form 6,7-methylenedioxy,

R_1 is alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl portion is of 3 to 6 carbon atoms and the alkyl portion is of 1 or 2 carbon atoms, or



m is 0 or 1, and

X and X′ are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or trifluoromethyl

with the further proviso that the unsaturation in any alkenyl or alkynyl is on other than the alpha carbon atom.

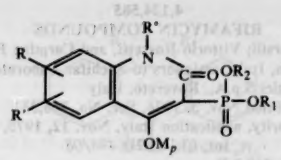
4,124,588

4-HYDROXY-QUINOLIN-2-ONE-3-PHOSPHONIC ACID ESTERS

Goetz E. Hardtmann, Morristown, and Gary M. Coppola, Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

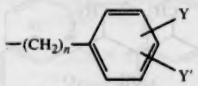
Filed Mar. 1, 1976, Ser. No. 662,707
Int. Cl.[2] C07D *213/60*
U.S. Cl. 546—21 **17 Claims**

1. A compound of the formula:



wherein

R^* is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl portion is of 1 or 2 carbon atoms, or



M_p is hydrogen or a cation forming a pharmaceutically acceptable salt,

n is 0 or 1,

Y and Y′ are independently hydrogen, fluoro, chloro, or bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or trifluoromethyl,

R and R′ are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, nitro or trifluoromethyl, with the proviso that only one of R and R′ can be from the group consisting of nitro and trifluoromethyl, or R and R′ together form 6,7-methylenedioxy, and

R_1 and R_2 are independently alkyl of 1 to 4 carbon atoms, with the further proviso that the unsaturation in any alkenyl or alkynyl is on other than the alpha carbon atom.

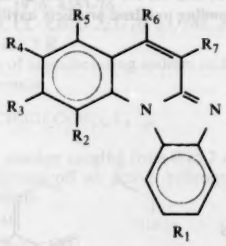
4,124,589

BENZIMIDAZO-[1,2-A]-QUINOLINES

Dieter Günter, Kelkheim, Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 9, 1976, Ser. No. 665,259
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1975, 2510528
Int. Cl.[2] C07D *471/04*
U.S. Cl. 546—70 **9 Claims**

1. A benzimidazo-[1,2-a]-quinoline of the formula



wherein

R_1 is a single substituent selected from the group of hydrogen, amino, lower alkanoylamino, nitro or lower alkyl;

R_2 is hydrogen or carboxyl;

R_3 is hydrogen, amino, acetamino, lower alkoxy or hydroxy;

R_4 is hydrogen or lower alkoxy;

R_5 is hydrogen or together with R_4 a fused benzene ring;

R_6 is cyano, hydrogen, carboxy or lower alkoxy and

R_7 is hydrogen, acetyl, cyano, carboxy, phenylsulfonyl or

R_6 and R_7 together are a fused 1,2,3-triazole ring, with the

proviso that R_7 is phenylsulfonyl only when R_6 is hydrogen and at least one of R_6 and R_7 is other than hydrogen.

4,124,590

SULFAMYLBENZOIC ACIDS

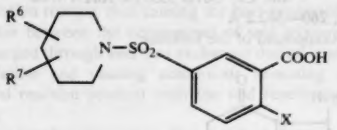
Gerald F. Holland, Old Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 481,195, Jun. 20, 1974, Pat. No. 3,992,441, which is a division of Ser. No. 318,213, Dec. 26, 1972, Pat. No. 3,843,662, which is a continuation-in-part of Ser. No. 206,514, Dec. 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 72,156, Sep. 14, 1970, abandoned. This application Aug. 11, 1976, Ser. No. 713,412

Int. Cl.[2] **C07D** *211/38, 211/72, 211/74;* **A61K** *31/445*

U.S. Cl. 546—221 **1 Claim**

1. A compound selected from the group consisting of those of the formula



and the lower alkyl esters and salts thereof with pharmacologically acceptable bases, wherein

X is selected from the group consisting of chloro, bromo, fluoro,

R^6 is selected from the group consisting of alkyloxyalkyl of one to four carbon atoms in each alkyl group, trifluoromethyl, methylene, oxo, benzyloxymethyl, and

R^7 is selected from the group consisting of hydrogen and alkyloxyalkyl of one to four carbon atoms in each alkyl group, trifluoromethyl, benzyloxymethyl.

4,124,591

ISOXAZOLYLMETHYLTHIOL CARBAMATES

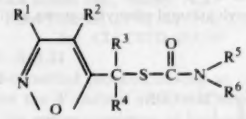
Karl Eicken, Wachenheim; Hans Theobald, Limburgerhof; Hanspeter Hansen, Ludwigshafen; Bruno Wuerzer, and Kurt Fett, both of Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 27, 1977, Ser. No. 810,194

Int. Cl.[2] **C07D** *261/08, 413/12*

U.S. Cl. 260—307 H **4 Claims**

1. An isoxazolylmethylthiol carbamate of the formula



I

wherein R^1 denotes hydrogen, lower alkyl of 1 to 6 carbon atoms, unsubstituted or lower alkyl-substituted cycloalkyl of 3 to 8 ring carbon atoms, benzyl, phenylethyl, phenyl chlorophenyl, fluorophenyl, dichlorophenyl or trifluoromethylphenyl, R^2 denotes hydrogen, lower alkyl of 1 to 6 carbon atoms, lower alkyl of 1 to 6 carbon atoms substituted by chlorine, phenyl or halogen, R^3 denotes hydrogen or lower alkyl, R^4 denotes hydrogen or lower alkyl, and R^5 and R^6 are identical or different and each denotes lower alkyl of 1 to 6 carbon atoms, lower alkenyl of 2 to 4 carbon atoms, unsubstituted or lower alkyl-substituted cycloalkyl of 3 to 8 ring carbon atoms, alkoxyalkyl of 2 to 6 carbon atoms or haloalkyl of 1 to 4 carbon atoms, and additionally R^5 and R^6 together with the nitrogen atom denote an unsubstituted or lower alkyl-substituted heterocyclic ring selected from the group consisting of azetidine, 2-methylazetidine, 2,4-dimethylazetidine, 2,4,4-trimethylazetidine, pyrrolidine, 2-methylpyrrolidine, 2-ethylpyrrolidine, 2,5-dimethylpyrrolidine, piperidine, 2-methylpiperidine, 2-ethylpiperidine, 2-methyl-5-ethylpiperidine, hexahydroazepine, 2-methylhexahydroazepine, 2,3-dimethylhexahydroazepine, heptamethyleneimine, bicyclo-[3,2,2]-3-and 3,5-dimethylmorpholine.

4,124,592

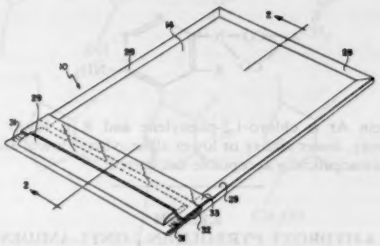
BIS-INDOLYL PHTHALIDES AND NAPHTHALIDES

Stanley M. Bloom, Waban; Alan L. Borror, Lexington, and Paul S. Huyffer, West Boxford, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

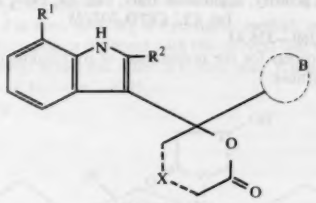
Continuation-in-part of Ser. No. 108,277, Jan. 21, 1971, abandoned. This application Oct. 23, 1973, Ser. No. 409,012

Int. Cl.[2] **C07D** *209/04, 209/20, 209/14*

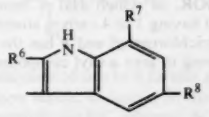
U.S. Cl. 260—326.12 R **41 Claims**



1. A compound of the formula:



wherein one of R^1 and R^2 is a hydrogen-bonding group selected from carboxy, $-NHSO_2R'''$ wherein R''' is selected from alkyl having 1 to 20 carbon atoms, phenyl, naphthyl, phenyl-substituted alkyl having up to 18 carbon atoms and alkyl-substituted phenyl having up to 18 carbon atoms, $-SO_2NHR''''$ wherein R'''' has the same meaning as given for R''' and o-hydroxyphenyl, said o-hydroxyphenyl being unsubstituted or substituted in one of the 4- or 5-positions with alkoxy containing 1 to 12 carbon atoms, and the other is hydrogen; B is an indol-3-yl radical,



wherein R^6 and R^7 each are selected from hydrogen, methoxy, carboxy, $-NHSO_2R'''$ wherein R''' has the same meaning given above, $-SO_2NHR''''$ wherein R'''' has the same meaning given above and o-hydroxyphenyl, said o-hydroxyphenyl being unsubstitued or substituted in one of the 4- or 5-positions with alkoxy containing 1 to 12 carbon atoms, at least one of R^6 and R^7 being hydrogen; R^8 is selected from hydrogen, carboxy, cyano, halo, and alkoxy having 1 to 12 carbon atoms; and X represents the atoms necessary to complete a ring-closing

moiety selected from phthalide and naphthalide, said ring-closing moiety being unsubstituted.

4,124,593

AROMATIC DICARBOXIMIDES

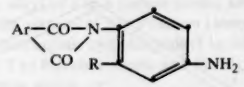
Heinz W. Gschwend, New Providence, N.J., and Malvin J. Hillman, Liverpool, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 631,789, Nov. 13, 1975, Pat. No. 4,025,505, which is a continuation-in-part of Ser. No. 547,063, Feb. 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 449,872, Mar. 11, 1974, Pat. No. 3,941,883. This application Jun. 18, 1976, Ser. No. 697,494

Int. Cl.[2] C07D *209/34*

U.S. Cl. 260—326 N **5 Claims**

1. An N-(4-aminophenyl)-aromatic dicarboximide of the formula



wherein Ar is chloro-1,2-phenylene and R is lower alkyl, (hydroxy, lower alkoxy or lower alkanoyloxy)-lower alkyl, or a pharmaceutically acceptable salt thereof.

4,124,594

4-HYDROXY PYRROLIDIN-2-ONYL-AMIDES

Riccardo Monguzzi, Corsico (Milan), and Giorgio Pifferi, Milan, both of Italy, assignors to I.S.F. Spa, Milan, Italy

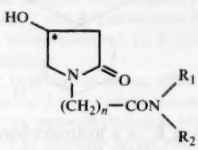
Filed Feb. 8, 1978, Ser. No. 876,167

Claims priority, application Italy, Feb. 11, 1977, 20226 A/77

Int. Cl.[2] C07D *207/28*

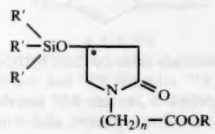
U.S. Cl. 260—326.43 **7 Claims**

1. A process for the preparation of pyrrolidine compounds of the formula:



(I)

wherein *n* is 1, 2 or 3, R_1 and R_2, which can be the same or different, are hydrogen or alkyl having 1 to 3 carbon atoms and the asterisk indicates the center of asymmetry of the molecule, either as separated enantiomers or as a mixture thereof, comprising (1) reacting γ-amino-β-hydroxybutyric acid, either as separated enantiometers or as a mixture, under anhydrous conditions with a silylating agent, (2) reacting the product obtained, in the presence of an acid acceptor, with a halogen compound of an ester of an aliphatic acid of the formula $Hal(CH_2)_n$—COOR, in which Hal is bromine, chlorine or iodine, R is alkyl having 1 to 4 carbon atoms, trichlorophenyl, nitrophenyl or trichloroethyl and *n* has the same meaning as above, (3) cyclizing to give a silyl compound of the formula:



(II)

in which R′ is methyl or ethyl and *n*. R and the asterisk have the same meanings as above, (4) hydrolyzing compound (II) to give the corresponding 4-hydroxy compound and (5) then reacting said 4-hydroxy compound with ammonia or with a mono- or disubstituted amine of the formula $R_1.NH.R_2$, in which R_1 and R_2 have the same meanings as above except that both cannot be hydrogen atoms.

4,124,595

SYNTHESIS OF BIOTIN

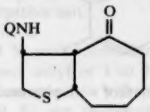
Pasquale N. Confalone; Elizabeth D. Lollar, both of Bloomfield; Giacomo Pizzolato, Belleville, and Milan R. Uskokovic, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 771,218, Feb. 23, 1977, Pat. No. 4,062,868. This application Sep. 26, 1977, Ser. No. 836,878

Int. Cl.[2] C07D *333/24;* A01N *9/00*

U.S. Cl. 260—332.2 A **4 Claims**

1. A compound of the formula:



wherein Q is selected from the group consisting of $—CO_2R_4$, $—COR_4$, $—COCX_3$, and tosyl, where R_4 is lower alkyl and X is halogen, the racemates and optical antipodes thereof.

4,124,596

THIENOTHIENYLCARBONYL-PHENYLALKANOIC ACIDS AND DERIVATIVES THEREOF

Jean-Louis Fabre, Paris; Daniel Farge, Thiais, and Claude James, Paris, all of France, assignors to Rhone-Poulenc Industries, Paris, France

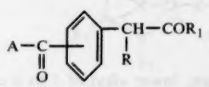
Filed Jan. 27, 1977, Ser. No. 763,141

Claims priority, application France, Jan. 29, 1976, 76 02378; Jul. 20, 1976, 76 22066; Dec. 16, 1976, 76 37858

Int. Cl.[2] C07D *333/24;* A01N *9/00*

U.S. Cl. 260—332.2 A **13 Claims**

1. A thienothienylcarbonyl-phenylalkanoic acid compound of the formula:



(wherein R represents hydrogen or an alkyl radical, R_1 represents a hydroxy, amino or alkoxy radical, or an alkylamino or dialkylamino group; the various alkyl radicals and the alkoxy radical being optionally substituted by a dialkylamino group, it being understood that in the definitions of R and R_1 above the alkyl radicals and the alkoxy radical contain from 1 to 4 carbon atoms, and the symbol A represents the thieno[2,3-b]thien-2-yl or thieno[3,2-b]thien-2-yl radical, the A—CO— grouping being attached to the 3- or 4-position of the phenyl ring), and when R_1 represents the hydroxy radical its pharmaceutically acceptable metal salts, ammonium salt and addition salts with nitrogen-containing bases, and when R_1 represents a group containing basic nitrogen its pharmaceutically acceptable acid addition salts.

4,124,597

PROCESS FOR MAKING (DL) PANTOLACTONE

Joachim Schmidt; Wolfgang Bamberg; Hartmut Grunert; Erhard Schorm, and Christian Weigelt, all of Jena, German Democratic Rep., assignors to VEB Jenapharm, Jena, German Democratic Rep.

Continuation of Ser. No. 476,290, Jun. 4, 1974, abandoned, which is a division of Ser. No. 298,831, Oct. 19, 1972, abandoned. This application Mar. 16, 1976, Ser. No. 667,410

Int. Cl.[2] C07D *307/32*

U.S. Cl. 260—343.6 **14 Claims**

1. The process of making DL-α-hydroxy-β,β-dimethyl-γ-butyrolactone in a continuous operation comprising the steps, continuously performed, of

(a) introducing isobutyraldehyde, formalin and a sodium cyanide solution continuously at predetermined rates into a circulation reactor constituting a closed system, circulating the said mixture in said reactor while cooling the circulating mass in a heat exchanger forming part of said circulation reactor, thus causing the heat generated in the reaction between the components of said mixture to be discharged through said heat exchanger during continuing circulation and causing continuous re-mixing of the formed reaction product with the said reaction components;

(b) continuously passing reaction product formed in the circulation reactor into an after-treatment reactor where the reaction is completed without further mixing;

(c) continuously passing reaction product in the form of formisobutyraldol-cyanohydrin from said aftertreatment reactor into a first reaction chamber, reacting therein the product with measured amounts of a continuously introduced non-oxidizing strong acid at an elevated temperature and pressure so as to hydrolyze the product, thus forming a solution of α-γ-dihydroxy-β,β-dimethylbutyric acid;

(d) passing the latter solution into a second reaction chamber and maintaining the solution therein at said elevated temperature and pressure until the α-γ-dihydroxy-β,β-dimethylbutyric acid is lactonized to DL-α-hydroxy-β,β-dimethyl-γ-butyrolactone and finally

(e) recovering the lactone from the acid solution.

4,124,598

PSORALENS

John E. Hearst; Henry Rapoport; Stephen Isaacs, all of Berkeley, and Che-Kun J. Shen, Albany, all of Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Oct. 20, 1976, Ser. No. 734,031

Int. Cl.[2] C07D *493/04*

U.S. Cl. 260—343.21 **5 Claims**

1. A 4,5',8-trimethyl psoralen having an organic functional substituent on the 4' carbon atom said substituent being selected from the group consisting of halogenated lower alkyl, hydroxy lower alkyl, lower alkoxy lower alkyl and primary amino lower alkyl.

4,124,599

ENLARGED-HETERO-RING PROSTACYCLIN ANALOGS

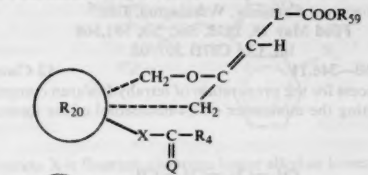
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 725,547, Sep. 22, 1976, abandoned, which is a continuation-in-part of Ser. No. 716,771, Aug. 23, 1976, abandoned. This application Jul. 28, 1977, Ser. No. 819,941

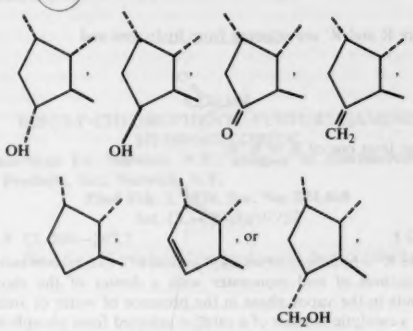
Int. Cl.[2] C07D *311/02;* **A61K** *31/35*

U.S. Cl. 260—345.2 **23 Claims**

1. A 5Z compound of the formula



wherein is



wherein L is

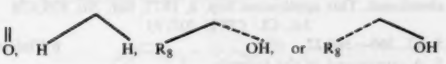
(1) $-(CH_2)_d-C(R_2)_2-$

(2) $-CH_2-O-CH_2-Y-$ or

(3) $-CH_2CH=CH-$

wherein d is zero to 5, R_2 is hydrogen, methyl, or fluoro, being the same or different with the proviso that one R_2 is not methyl when the other is fluoro, and Y is a valence bond, $-CH_2-$ or $-(CH_2)_2-$,

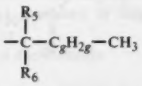
wherein Q is



wherein R_8 is hydrogen or alkyl of one to 4 carbon atoms, inclusive,

wherein R_{59} is (a) hydrogen, (b) alkyl of one to 12 carbom atoms, inclusive, or (c) a pharmacologically acceptable cation;

wherein R_4 is



wherein C_gH_{2g} is alkylene of one to 9 carbon atoms, inclusive, with one to 5 carbon atoms, inclusive, in the chain between $-CR_5R_6-$ and terminal methyl, wherein R_5 and R_6 are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that one of R_5 and R_6 is fluoro only when the other is hydrogen or fluoro; and

wherein X is

(1) trans-$CH=CH-$

(2) cis—$CH=CH-$

(3) $-C\equiv C-$ or

(4) $-CH_2CH_2-$;

including the lower alkanoates thereof.

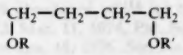
4,124,600

PREPARATION OF TETRAHYDROFURAN

Colie L. Jenkins, Jr., Memphis, Tenn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 28, 1975, Ser. No. 581,566
Int. Cl.[2] C07D *307/08*
U.S. Cl. 260—346.11 **12 Claims**

1. A process for the preparation of tetrahydrofuran comprising contacting the monoester of 1,4-butanediol of the formula



where R and R′ are selected from hydrogen and

and at least one of R or R′ is

where R^2 is hydrogen or an alkyl radical of 1 to 5 carbon atoms or mixtures of said monoester with a diester of the above formula in the vapor phase in the presence of water or steam with a catalytic amount of a catalyst selected from phosphoric acid on a support material and eta alumina at a temperature of from about 200° to about 325° C, wherein the monoester or said mixtures are contacted with the catalyst from 1 second to 1 minute, and recovering the tetrahydrofuran from the reaction mixture.

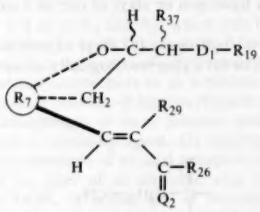
4,124,601

CERTAIN 5-HALO-6,9α-EPOXY-14-BROMO(OR CHLORO)-PGF$_1$ COMPOUNDS

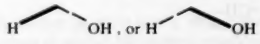
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 755,674, Dec. 30, 1976, abandoned. This application Sep. 2, 1977, Ser. No. 829,678
Int. Cl.[2] C07D *307/93*
U.S. Cl. 260—346.22 **6 Claims**

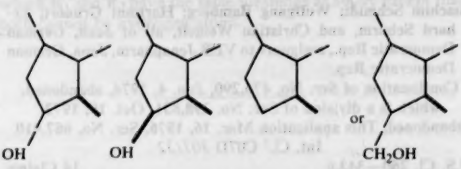
1. A compound of the formula



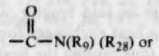
wherein D_1 is
(1) $-(CH_2)_d-C(R_2)_2-$ or
(2) $-CH_2-O-CH_2-Y-$
wherein *d* is zero to 5, R_2 is hydrogen, methyl, or fluoro, being the same or differnt with the proviso that one R_2 is not methyl when the other is fluoro, and Y is a valence bond, $-CH_2-$ or $-(CH_2)_2-$,
wherein Q_2 is



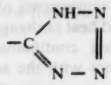
wherein is



wherein R_{19} is
(1) $-COOR_{20}$
(2) $-CH_2OH$
(3) $-CH_2N(R_9)(R_{28})$

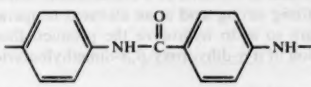


(4)

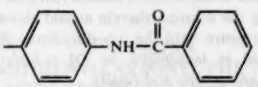


(5)

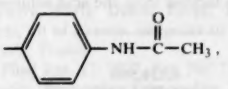
wherein R_{20} is (a) hydrogen, (b) alkyl of one to 12 carbon atoms, inclusive, (c) cycloalkyl of 3 to 10 carbon atoms, inclusive, (d) aralkyl of 7 to 12 carbon atoms, inclusive, (e) phenyl, (f) phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive,



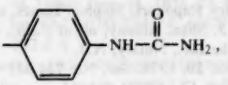
(g)



(h)



(i)



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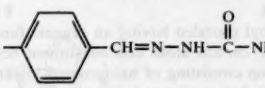
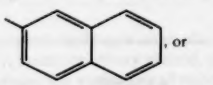
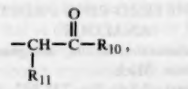


(k)



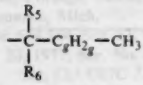
(l)

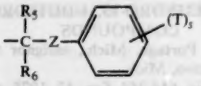


(m)

wherein R_{10} is phenyl, p-bromophenyl, p-biphenylyl, p-nitrophenyl, p-benzamidophenyl, or 2-naphthyl, and wherein R_{11} is hydrogen or benzoyl, wherein R_9 is hydrogen, methyl, or ethyl, and wherein R_{28} is hydrogen, alkyl of one to 4 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive,

phenyl, or phenyl substituted with alkyl of one to 4 carbon atoms, inclusive,
wherein R_{26} is


(1)


(2)

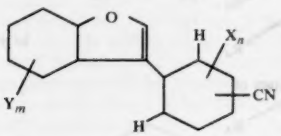
wherein C_gH_{2g} is alkylene of one to 9 carbon atoms, inclusive, with one to 5 carbon atoms, inclusive, in the chain between $-CR_5R_6-$ and terminal methyl, wherein R_5 and R_6 are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that one of R_5 and R_6 is fluoro only when the other is hydrogen or fluoro and the further proviso that neither R_5 nor R_6 is fluoro when Z is oxa (-O-); wherein Z represents an oxa atom (-O-) or C_jH_{2j} wherein C_jH_{2j} is a valence bond or alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive between CR_5R_6- and the phenyl ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or alkoxy of one to 4 carbon atoms, inclusive, and s is zero, one, 2 or 3, with the proviso that not more than two T's are other than alkyl and when *s* is 2 or 3 the T's are either the same or different wherein R_{29} is bromo or chloro,
wherein R_{37} is iodo, bromo or chloro, and ~ indicates attachment in alpha or beta configuration.

4,124,602
OPTIONALLY SUNBSTITUTED 3-(CYANOPHENYL)BENZOFURANS

Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 724,719, Sep. 20, 1976, Pat. No. 4,048,323, which is a continuation-in-part of Ser. No. 616,275, Sep. 24, 1975, abandoned. This application Jul. 1, 1977, Ser. No. 812,181
Int. Cl.[2] C07D *307/81*
U.S. Cl. 260—346.22 **2 Claims**

1. A compound of the formula



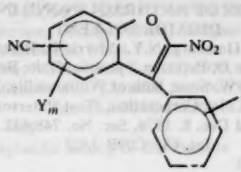
wherein X is fluorine, chlorine, lower alkyl or lower alkoxy and Y is methyl, methoxy, fluorine or chlorine and *m* and *n* are independently 0, 1 or 2.

4,124,603
4-(OR 5 OR 6 OR 7)CYANO-2-NITRO-3-PHENYLBENZOFURANS

Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 724,572, Sep. 20, 1976, Pat. No. 4,067,993, which is a continuation-in-part of Ser. No. 616,274, Sep. 24, 1975, abandoned. This application Nov. 16, 1977, Ser. No. 851,857
Int. Cl.[2] C07D *307/82*
U.S. Cl. 260—346.22 **11 Claims**

1. A compound of the formula



wherein X is fluorine, chlorine, lower alkyl or lower alkoxy, Y is methyl, methoxy, fluorine or chlorine and *m* and *n* are independently 0, 1 or 2.

4,124,604
BIS-[(5-P-CHLOROPHENYL)FURFURYL]AMINE HYDROCHLORIDE

Chia-Nien Yu, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Feb. 2, 1978, Ser. No. 874,469
Int. Cl.[2] C07D *307/52*
U.S. Cl. 260—347.7 **1 Claim**

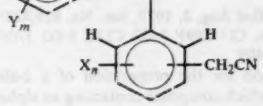
1. Bis-[(5-p-chlorophenyl)furfuryl]amine hydrochloride.

4,124,605
2-NITRO OR 2-BROMO-(3-CYANOMETHYLPHENYL)BENZOFURANS

Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

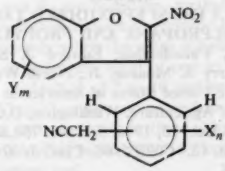
Division of Ser. No. 724,716, Sep., 1976, Pat. No. 4,066,782, which is a continuation-in-part of Ser. No. 616,276, Sep., 1975, abandoned. This application Oct. 14, 1977, Ser. No. 842,234
Int. Cl.[2] C07D *307/82*
U.S. Cl. 260—346.22 **3 Claims**

1. A compound of the formula



wherein X is halogen, lower alkyl, lower alkoxy or trifluoromethyl, Y is methyl, methoxy or halogen and *m* and *n* are independently 0, 1 or 2.

2. A compound of the formula



wherein X is halogen, lower alkyl, lower alkoxy or trifluoromethyl, Y is methyl, methoxy or halogen and *m* and *n* are independently 0, 1 or 2.

4,124,606

SULFONATION OF ANTHRAQUINONE IN SULFUR DIOXIDE SOLVENT

Louis G. Anello, Hamburg, N.Y.; Morris B. Berenbaum, Summit, N.J.; James O. Peterson, Sylvania, Ohio; Bernard Sukornick, and Allen W. Sogn, both of Williamsville, N.Y., assignors to Buffalo Color Corporation, West Paterson, N.J.

Filed Dec. 8, 1976, Ser. No. 748,433

Int. Cl.[2] C09B *3/02*

U.S. Cl. 260—370 **22 Claims**

1. In a method for producing sulfonated anthraquinones by reacting anthraquinones and a sulfur trioxide member selected from the group consisting of SO_3 and oleum and dissolving the resulting sulfonated anthraquinone in water to separate it from unreacted anthraquinone, the improvement which comprises carrying out said reaction in a reaction mixture comprising anthraquinone, sulfur trioxide member and a liquid sulfur dioxide solvent at a temperature of from about 60° C. to about 100° C. for from about 1 hour to about 20 hours under sufficient pressure for said sulfur dioxide solvent to be liquid; and subsequent to said reaction vaporizing said sulfur dioxide prior to adding sufficient water to dissolve the sulfonated anthraquinone.

4,124,607

PREPARATION OF STEROL SUBSTRATES FOR BIOCONVERSION

John M. Beaton, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 15, 1977, Ser. No. 787,720

Int. Cl.[2] C07J *9/00*

U.S. Cl. 260—397.25 **20 Claims**

1. A process for preparing an aqueous suspension of microcrystalline sterol or sterols for bioconversion which comprises:

(1) dissolving the sterol or sterols in an organic diluent forming a solution,

(2) adding the solution to an aqueous system, and

(3) simultaneously removing the organic diluent.

2. A process according to claim **1** where the sterol or sterols are selected from the group consisting of stigmasterol, β-sitosterol, campesterol, ergosterol, brassicasterol, cholesterol and lanosterol or mixtures thereof.

4,124,608

PREPARATION OF 2-OXOALKANOIC ACIDS

John M. Larkin, Austin, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Aug. 3, 1977, Ser. No. 821,435

Int. Cl.[2] C09F *5/00;* **C11C** *3/00, 1/00*

U.S. Cl. 260—405 **35 Claims**

23. A method for the preparation of a 2-alkanoyloxy-2-alkenoic acid which comprises contacting an alpha-nitroketone with an alkanoic acid anhydride and a tertiary amine.

34. A method according to claim **23** wherein said 2-alkanoyloxy-2-alkenoic acid is 3-ethanoyloxy-2-hexadecenoic acid.

4,124,609

POLYOLS FROM EPOXIDIZED TALLOW TRIMETHYLOLPROPANE AND PROPYLENE OXIDE

Alexander Bilyk, Philadelphia; Edward J. Saggese, Upper Darby, and Harry A. Monroe, Jr., North Wales, all of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Dec. 13, 1976, Ser. No. 750,339

Int. Cl.[2] C09F *5/08;* **C11C** *3/00*

U.S. Cl. 260—406 **9 Claims**

1. A process for preparing polyols suitable for use in urethane foams comprising the steps of:

a) reacting, under acid catalysis, trimethylolpropane with epoxidized tallow;

b) reacting, under alkaline catalysis trimethylolpropane with the product of step (a); and

c) reacting the product of step (b) with propylene oxide.

4,124,610

12,13(E)-DIDEHYDRO-13,14-DIHYDRO-PGD$_2$ COMPOUNDS

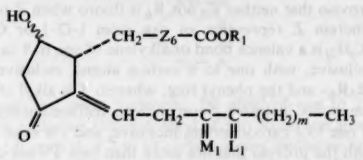
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975, and Ser. No. 809,248, Jun. 23, 1977, Pat. No. 4,099,014, which is a division of said Ser. No. 614,244, Sep. 17, 1975. This application Jun. 23, 1977, Ser. No. 809,241

Int. Cl.[2] C07C *177/00*

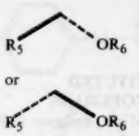
U.S. Cl. 260—408 **25 Claims**

1. A prostaglandin analog of the formula



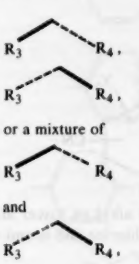
wherein m is one to 5, inclusive;

wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein Z_6 is

(1) cis—CH=CH—CH_2—$(CH_2)_g$—CF_2— or

(2) cis—CH=CH_2—CH_2—$(CH_2)_g$—CH_2—,

wherein g is one, 2, or 3.

4,124,611

12,13(E)-DIDEHYDRO-13,14-DIHYDRO-PGD$_1$ COMPOUNDS

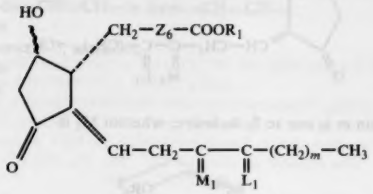
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975. This application Jun. 23, 1977, Ser. No. 809,242

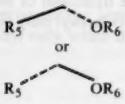
Int. Cl.^{2} C07C *177/00*

U.S. Cl. 260—408 **25 Claims**

1. A prostaglandin analog of the formula

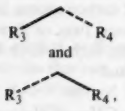


wherein *m* is one to 5, inclusive;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_6 is
(1) $-(CH_2)_3-(CH_2)_g-CF_2-$ or
(2) $-(CH_2)_3-(CH_2)_g-CH_2-$,
wherein *g* is one, 2, or 3.

4,124,612

9-DEOXY-PGD$_2$ COMPOUNDS

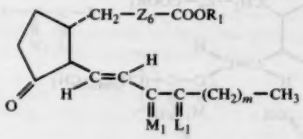
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975, abandoned. This application Jun. 23, 1977, Ser. No. 809,251

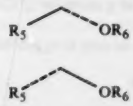
Int. Cl.^{2} C07C *177/00*

U.S. Cl. 260—408 **25 Claims**

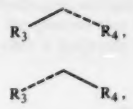
1. A prostaglandin analog of the formula



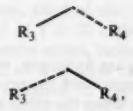
wherein *m* is one to 5, inclusive;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is



or a mixture of



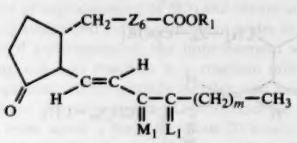
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_6 is
(1) cis—ach=CH—CH_2—$(CH_2)_g$—CF_2— or
(2) cis—CH—CH_2—$(CH_2)_g$—CH —,
wherein *g* is one, 2, or 3.

4,124,613
9-DEOXY-PGD$_1$ COMPOUNDS

David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

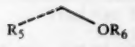
Division of Ser. No. 614,244, Sep. 17, 1975, and Ser. No. 809,248, Jun. 23, 1977, Pat. No. 4,099,014, which is a division of Ser. No. 614,244,. This application Jun. 23, 1977, Ser. No. 809,252
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—408 25 Claims

1. A prostaglandin analog of the formula



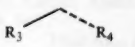
wherein *m* is one to 5, inclusive;
wherein M_1 is

or



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

or a mixture of



and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_6 is

$$—(CH_2)_3—(CH_2)_g—CF_2— \quad (1)$$

or

$$—(CH_2)_3—(CH_2)_g—CH_2—, \quad (2)$$

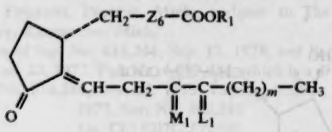
wherein *g* is 1, 2, or 3.

4,124,614
12,13(E)-DIDEHYDRO-13,14-DIHYDRO-9-DEOXY-PGD$_2$ COMPOUNDS

David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975. This application Jun. 23, 1977, Ser. No. 809,262
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—408 25 Claims

1. A prostaglandin analog of the formula

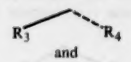


wherein *m* is one to 5, inclusive; wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

or a mixture of



and

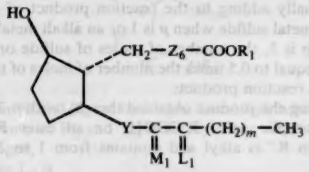
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_6 is
(1) cis—CH=CH—CH_2—$(CH_2)_g$—CF_2— or
(2) cis—CH=CH_2—CH_2—$(CH_2)_g$—CH_2—,
wherein *g* is one, 2, or 3.

4,124,615
9β-PGD$_2$ COMPOUNDS

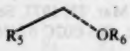
Douglas R. Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,242, Sep. 17, 1975, Pat. No. 4,016,184. This application Dec. 30, 1976, Ser. No. 756,109
Int. Cl.[2] C07C *177/00*
U.S. Cl. 280—408 33 Claims

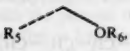
1. A prostaglandin analog of the formula



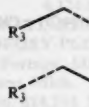
wherein
Y is cis—CH=CH—or trans—CH=CH—;
wherein
m is one to 5, inclusive;
wherein
M_1 is



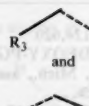
or



wherein
R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein
L_1 is



or a mixture of



and
wherein
R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein
R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein
Z_6 is
(1) cis—CH=CH—CH_2—$(CH_2)_g$—CF_2—,
(2) cis—CH=CH—CH_2—$(CH_2)_g$—CH_2—, or
(3) cis—CH_2—CH=CH—$(CH_2)_g$—CH_2—,
wherein
g is one, 2, or 3.

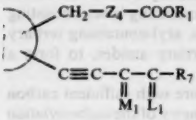
4,124,616

COMPOSITION AND PROCESS

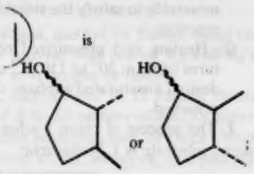
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 657,740, Feb. 13, 1976, Pat. No. 4,099,015. This application Aug. 1, 1977, Ser. No. 820,971
Int. Cl.[2] **C07C** *177/00*
U.S. Cl. 260—408 **73 Claims**

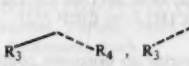
1. A prostaglandin analog of the formula



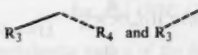
wherein



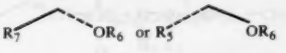
wherein Z_4 is
$-(CH_2)_3-(CH_2)_g-CH_2-$ or
$-(CH_2)_3-(CH_2)_g-CF_2$; wherein *g* is one, 2, or 3;
wherein R_7 is
$-(CH_2)_m-CH_3$, wherein *m* is one to 5, inclusive;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,124,617

PROCESS FOR PREPARING UNSATURATED ALIPHATIC ESTERS FROM ALIPHATIC DIENES

John F. Knifton, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,708
Int. Cl.[2] **C09F** *5/08;* **C11C** *3/02, 1/00*
U.S. Cl. 260—410 **14 Claims**

1. The process of this invention whereby unsaturated carboxylic (fatty) acids and their ester derivatives are prepared from aliphatic conjugated diene substrates containing from 4 to 8 carbon atoms according to the procedure of:

(a) Admixing each two moles of said aliphatic conjugated diene with a three component mixture consisting of:

(i) At least a catalytic quantity of a palladium catalyst consisting of one or more palladium salts in combination with one or more tertiary phosphorus containing donor ligands.

(ii) At least a molar equivalent of hydroxylated coreactant selected from the group consisting of water or an aliphatic alkanol containing 1 to 12 carbon atoms.

and (iii) A nitrogen-containing tertiary base selected from the three classes of nitrogen-containing bases consisting of N-heterocyclic amine bases, aryl-containing tertiary amine bases and aliphatic tertiary amides, to form a reaction mixture.

(b) Pressurizing said reaction mixture with sufficient carbon monoxide to satisfy the stoichiometry of the carbonylation reaction.

(c) Heating said pressurized reaction mixture to temperatures of from 30° to 150° C. until substantial formation of desired unsaturated aliphatic carboxylic acid derivatives is achieved.

2. The process of claim 1 wherein the aliphatic conjugated diene substrate is 1,3-butadiene.

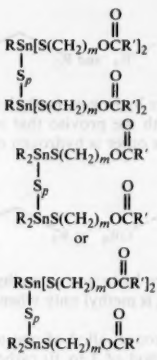
4,124,618

METHOD FOR PREPARING BIS(ORGANOTIN MERCAPTOALKANOL ESTER) SULFIDES

Robert D. Dworkin, Old Bridge, and Adam J. Ejk, Piscataway, both of N.J., assignors to M&T Chemicals Inc., Stamford, Conn.

Filed Nov. 2, 1976, Ser. No. 738,132
Int. Cl.[2] C11C 3/00; C07F 7/22
U.S. Cl. 260—410.6 **12 Claims**

1. A method for preparing an organotin compound of the general formula



wherein R and R′ are individually selected from the group consisting of alkyl containing from 1 to 20 carbon atoms, cycloalkyl, aralkyl, aryl and alkaryl, m is 2 or 3 and p is 1 or 2, said method consisting essentially of the following sequence of steps:

(1) reacting a monoorganotin trihalide of the formula $RSnX_3$, a diorganotin dihalide of the formula R_2SnX_2 or an equimolar mixture of $RSnX_3$ and R_2SnX_2 wherein X is a halogen selected from the group consisting of chlorine, bromine and iodine, with an aqueous solution containing a base selected from the group consisting of ammonium hydroxide, alkali metal hydroxides and alkali metal alkoxides, wherein the ratio of the number of equivalent weights of base to the number of moles of halogen initially present on the organotin halide is n-2:n, respectively, and the rate at which the reagents are combined is adjusted to avoid excessive overheating of the reaction mixture;

(2) adding n-2 moles of 2-mercaptoethanol or 3-mercaptopropanol to the resultant mixture;

(3) gradually adding to the reaction product of step 2 an alkali metal sulfide when p is 1 or an alkali metal disulfide when p is 2, the number of moles of sulfide or disulfide being equal to 0.5 times the number of moles of tin present in said reaction product;

(4) reacting the product obtained thereby with n-2 moles of a carboxylic acid, R′COOH, or an ester R′COOR″ wherein R″ is alkyl and contains from 1 to 20 carbon atoms;

(5) removing any by-product water from the resultant mixture to isolate said organotin compound.

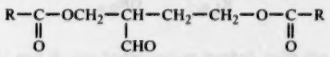
4,124,619

PREPARATION OF ESTERS OF HYDROXY TIGLIC ALDEHYDE

Peter Fitton, Pequannock, and Harold Moffet, Fairlawn, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

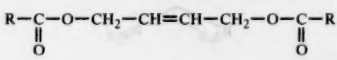
Continuation of Ser. No. 581,458, May 28, 1975, abandoned. This application Mar. 23, 1977, Ser. No. 780,553
Int. Cl.[2] C07C 67/28
U.S. Cl. 260—410.6 **1 Claim**

1. A process for preparing a formyl compound of the formula:



wherein R is alkyl or mononuclear aryl; wherein said aryl may be unsubstituted or substituted in one or more positions with halogen, nitro, lower alkyl or lower alkoxy;

comprising reacting in an inert organic solvent medium a compound of the formula:



wherein R is as above;

with hydrogen and carbon monoxide in the presence of hydridocarbonyltris(triphenylphosphine)rhodium (I) at a temperature of from 50° C. to 100° C. and a pressure of from 30 atmospheres to 150 atmospheres.

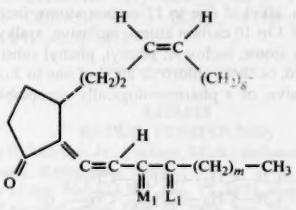
4,124,620

CIS-4,5-DIDEHYDRO-9-DEOXY-PGD$_1$ COMPOUNDS

David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975, and Ser. No. 809,248, Jun. 23, 1977, Pat. No. 4,099,014, which is a division of said Ser. No. 614,244. This application Jun. 23, 1977, Ser. No. 809,250
Int. Cl.[2] C07C 177/00
U.S. Cl. 260—413 **12 Claims**

1. A prostaglandin analog of the formula



wherein m is one to 5, inclusive;

wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hyrogen;
wherein L_1 is

or a mixture of

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein g is one, 2, or 3.

4,124,621

CIS-4,5-DIDEHYDRO-12,13(E)-DIDEHYDRO-13,14-DIHYDRO-9-DEOXY-PGD$_1$ COMPOUNDS

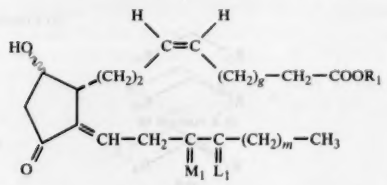
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975, and Ser. No. 809,248, Jun. 23, 1977, Pat. No. 4,099,014, which is a division of said Ser. No. 614,244. This application Jun. 23, 1977, Ser. No. 809,263

Int. Cl.^{2} C07C *121/00*

U.S. Cl. 260—413 **12 Claims**

1. A prostaglandin analog of the formula



wherein m is one to 5, inclusive;
wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein g is one, 2, or 3.

4,124,622

CIS-4,5-DIDEHYDRO-12,13(E)-DIDEHYDRO-13,14-DIHYDRO-9,10-DIDEHYDRO-9-DEOXY-PGD$_1$ COMPOUNDS

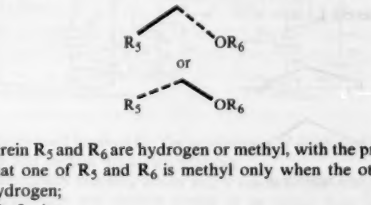
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975, and Ser. No. 809,248, Jun. 23, 1977, Pat. No. 4,099,014, which is a division of Ser. No. 614,244,. This application Jun. 23, 1977, Ser. No. 809,348

Int. Cl.^{2} C07C *127/00*

U.S. Cl. 260—413 **12 Claims**

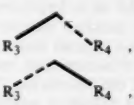
1. A prostaglandin analog of the formula



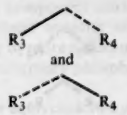
wherein m is 1 to 5, inclusive;
wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of 1 to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein g is one, 2 or 3.

4,124,623

INTER-OXA-12,13(E)-DIDEHYDRO-13,14-DIHYDRO-PGD$_1$ COMPOUNDS

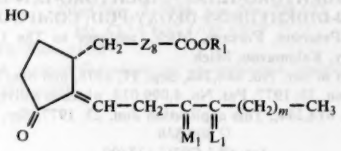
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975. This application Jun. 23, 1977, Ser. No. 809,247

Int. Cl.^{2} C07C *177/00*

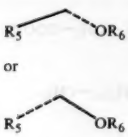
U.S. Cl. 562—503 **25 Claims**

1. A prostaglandin analog of the formula



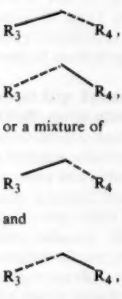
wherein m is one to 5, inclusive;

wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein Z_8 is

(1) $-CH_2-O-CH_2-(CH_2)_g-CH_2-$,

(2) $-(CH_2)_2-O-(CH_2)_g-CH_2-$, or

(3) $-(CH_2)_3-O-(CH_2)_g-$,

wherein g is one, 2, or 3.

4,124,624

INTER-OXA-9-DEOXY-PGD$_1$ COMPOUNDS

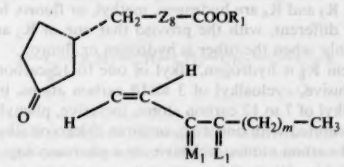
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975. This application Jun. 23, 1977, Ser. No. 809,253

Int. Cl.^{2} C07C *177/00*

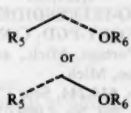
U.S. Cl. 562—503 **25 Claims**

1. A prostaglandin analog of the formula



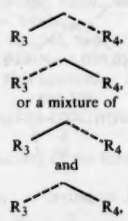
wherein m is 1 to 5, inclusive;

wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein Z_8 is

(1) $-CH_2-O-CH_2-(CH_2)_g-CH_2$,

(2) $-(CH_2)_2-O-(CH_2)_g-CH_2-$, or
(3) $-(CH_2)_3-O-(CH_2)_g-$,
wherein g is 1, 2, or 3.

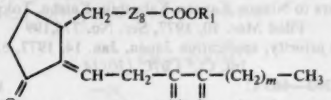
4,124,625

INTER-OXA-12,13(E)-DIDEHYDRO-13,14-DIHYDRO-9-DEOXY-PGD$_1$ COMPOUNDS

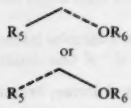
David C. Peterson, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,244, Sep. 17, 1975, Pat. No. 4,099,014. This application Jun. 23, 1977, Ser. No. 809,244
Int. Cl.[2] C07C *177/00*
U.S. Cl. 562—503 **25 Claims**

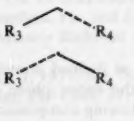
1. A prostaglandin analog of the formula



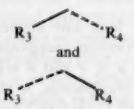
wherein m is one to 5, inclusive;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and
wherein Z_8 is
(1) $-CH_2-O-CH_2-(CH_2)_g-CH_2-$,
(2) $-(CH_2)_2-O-(CH_2)_g-CH_2-$, or
(3) $-(CH_2)_3-O-(CH_2)_g-$,
wherein g is one, 2, or 3.

4,124,626

CONTROL OF SWINE DYSENTERY WITH AV290 AND SALTS OR COMPLEXES THEREOF

Irwin B. Wood, Pennington, N.J., assignor to American Cyanamid Co., Stamford, Conn.

Continuation of Ser. No. 745,724, Nov. 29, 1976, abandoned. This application Oct. 26, 1977, Ser. No. 845,755
Int. Cl.[2] A61K *35/00*
U.S. Cl. 424—118 **5 Claims**

1. A method of treating hemorrhagic colitis in swine which comprises administering orally to infected swine an effective amount of an antibacterial ingredient selected from the group consisting of antibiotic AV290, antibiotic AV290 sulfate, an antibiotic AV290-syntan complex, an antibiotic AV290-alkyl sulfate complex, an antibiotic AV290 alkylated derivative, and mixtures thereof in any proportion in association with a pharmaceutical carrier to provide a daily dosage of from about 5 mg. to about 50 mg. per kilogram of body weight of said swine.

4,124,627

TRANS-FLUORO(PENTAFLUOROPHENYL)-BIS(TRIETHYLPHOSPHINE)NICKEL(II)

Darryl R. Fahey, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 5, 1977, Ser. No. 822,182
Int. Cl.[2] C07F *15/04*
U.S. Cl. 260—439 R **13 Claims**

1. Trans-fluoro(pentafluorophenyl)bis(triethylphosphine)-nickel(II).

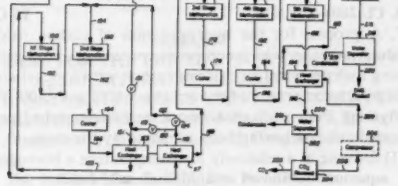
2. A process comprising reacting hexafluorobenzene and a nickel complex selected from the group consisting of tetrakis(-triethylphosphine)nickel(O), ethylenebis(triethylphosphine)-nickel(O), and 1,5-cyclooctadienebis(triethylphosphine)nickel(O) under reaction conditions suitable for producing trans-fluoro(pentafluorophenyl)bis(triethylphosphine)nickel(II).

4,124,628

SERIAL ADIABATIC METHANATION AND STEAM REFORMING

Henry W. McRobbie, Ossining, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jul. 28, 1977, Ser. No. 819,996
Int. Cl.[2] C10J *1/00*; C07C *9/04*
U.S. Cl. 260—449 M **14 Claims**



1. An improved process for the production of methane from hydrogen and carbon oxides comprising:
(a) adiabatically reacting steam and a reactant gas comprising hydrogen and carbon oxides in an initial fixed bed, adiabatic, catalytic, primary reaction zone, said steam and reactant gas being employed at an inlet feed temperature above about the minimum initiation temperature of the catalyst in said zone, said catalyst being hydrothermally stable from said inlet temperature to a temperature between about 1100° F. and about 1200° F., said steam being employed in an amount sufficient to prevent both (1) carbon formation on the catalyst employed in mid process and (2) overheating of said catalyst, said reaction produc-

ing an effluent gas at an outlet temperature within said hydrothermal stability range of said catalyst;

(b) adiabatically reacting said effluent gas and additional reactant gas comprising hydrogen and carbon oxides in an additional fixed bed, adiabatic, catalytic, primary reaction zone, said effluent gas and additional reactant gas being employed at an inlet temperature above about 900° F., said catalyst in the additional primary reaction zone comprising a steam-hydrocarbon reforming catalyst hydrothermally stable from said inlet feed temperature to a temperature between about 1250° F. and about 1600° F., said reaction producing further effluent gas at an outlet temperature of between about 1250° F. and about 1600° F.;

(c) cooling said further effluent gas from its outlet temperature to a secondary, wet, catalytic, reaction zone inlet temperature, said inlet temperature being above the minimum initiation temperature of the catalyst in said secondary zone;

(d) adiabatically reacting said cooled, further effluent gas in a secondary, wet, fixed bed, adiabatic, catalytic reaction zone, the catalyst in said secondary wet, catalytic reaction zone being essentially the same catalyst as employed in said initial primary reaction zone, thereby producing a product gas rich is methane, said product gas having a temperature below about the maximum operating temperature of said catalyst in said secondary reaction zone;

(e) condensing a substantial portion of the steam present in said product gas to water; and

(f) removing said water from the product gas, whereby the exothermic methanation operation is carried out without the need for expensive internally cooled surfaces or high recycle rates, catalyst damage is minimized, carbon deposition during preheating is essentially eliminated and methane formation in the initial primary reaction zone is enhanced.

4,124,629

THERMALLY STABLE COPRECIPITATED CATALYSTS USEFUL FOR METHANATION AND OTHER REACTIONS

Rowland C. Hansford, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 621,696, Oct. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 511,187, Oct. 2, 1974, abandoned. This application Jan. 10, 1977, Ser. No. 758,042

Int. Cl.[2] C07C *1/04, 1/10*

U.S. Cl. 260—449.6 M **16 Claims**

7. A process for the hydrogenation of carbon oxides to produce methane, which comprises contacting a feed gas comprising hydrogen and an oxide of carbon with a nickel-alumina catalyst at a temperature between about 600° and 1500° F., and recovering from said contacting a methane-enriched product gas, said catalyst having been prepared by the steps of:

(1) forming at a relatively low temperature a homogeneous aqueous solution of an aluminum salt, a nickel salt, and a delayed precipitant, said delayed precipitant being a water-soluble compound which, at said relatively low temperature, does not bring abut any significant precipitation of the metal salts dissolved in said solution, but which will hydrolyze at a relatively higher temperature to form ammonia and carbon dioxide;

(2) heating said aqueous solution to a sufficiently high temperature and for a sufficient time to bring about hydrolysis of said delayed precipitant with resultant gradual increase in pH of said solution and formation of a homogeneous coprecipitate of basic compounds of alumina and nickel;

(3) separating said coprecipitate from said solution before the latter reaches a pH above about 8; and

(4) drying and calcining said coprecipitate.

4,124,630

PROCESS FOR THE PRODUCTION OF CHLOROMETHYL THIOCYANATE

Heribert Offermanns, Grünaustrasse 2, 6450 Hanau 9; Werner Schwarze, Leerbachstrasse 117, 6000 Frankfurt, and Rudolf Vanheertum, Landwehr 4, 6450 Hanau, all of Germany

Filed Oct. 26, 1977, Ser. No. 845,839

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1976, 2648965

Int. Cl.[2] C07C *161/02*

U.S. Cl. 260—454 **15 Claims**

1. A process for the production of chloromethyl thiocyanate comprising reacting bromochloromethane with ammonium, alkali metal or alkaline earth metal thiocyanate in the presence of water and with an organic onium salt or base as a catalyst.

4,124,631

PROCESS FOR THE PRODUCTION OF AROMATIC NITRILES

Hiroshi Hayami, and Hitoshi Shimizu, both of Takasaki, Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

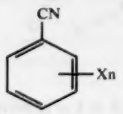
Filed Mar. 10, 1977, Ser. No. 776,199

Claims priority, application Japan, Jan. 14, 1977, 52-3275

Int. Cl.[2] C07C *120/14*

U.S. Cl. 260—465 C **10 Claims**

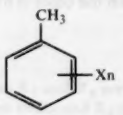
1. A process for the production of aromatic nitrile having the formula (I)



(I)

wherein X represents a chlorine, bromine, iodine or fluorine atom and *n* is 1 or 2.

by contacting aromatic compound having the formula (II)



(II)

wherein X and *n* are as defined above, with ammonia and molecular oxygen in the vapor phase in the presence of a catalyst having the following composition:

$$V_a P_b A_c O_d$$

wherein A denotes at least one element selected from the group consisting of chromium, manganese, iron, cobalt, nickel and tin, the subscripts *a, b, c* and *d* respectively denote the numbers of vanadium, phosphorus, A and oxygen atoms, and wherein *a* is 1, *b* is 0.1 to 3, *c* is 0 to 2 and *d* is a number determined by the valances of other elements.

4,124,632

SURFACE ACTIVE AGENTS

Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Mitry-Mory, both of France, assignors to Societe Anonyme dite l'Oreal, Paris, France

Division of Ser. No. 134,390, Apr. 15, 1971, Pat. No. 4,020,155, which is a continuation-in-part of Ser. No. 576,852, Sep. 2, 1966, abandoned. This application Jan. 12, 1977, Ser. No. 758,675

Claims priority, application Luxembourg, Sep. 6, 1965, 49442

Int. Cl.[2] C07C *101/24;* A61K *31/205*

U.S. Cl. 260—501.13 **3 Claims**

1. A chemical compound having the formula:

$$[A^+-CH_2-CONH-(CH_2)_n-B]\ X^-$$

in which:

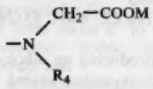
n is a whole number equal to 2 or 3;

A^+ represents an aliphatic tertiary amine corresponding to the formula:

wherein R_1 is a radical selected from the group consisting of methyl, cetyl and a radical derived from copra fatty acid having 6–18 carbon atoms;

R_2 and R_3 can be the same or different and represent a radical selected from the group consisting of alkyl and hydroxyalkyl radicals having 1 to 3 carbon atoms;

B is a radical corresponding to the formula:



in which R_4 is selected from the group consisting of alkyl and hydroxyalkyl radicals having 1–3 carbon atoms and a radical derived from copra fatty acids having 6–18 carbon atoms;

M represents an alkali metal selected from the group consisting of potassium and sodium; and X^- is a halide ion.

4,124,633

TELLURIUM CATALYZED DECOMPOSITION OF PEROXIDE INTERMEDIATES RESULTING FROM THE AUTOXIDATION OF UNSATURATED ALDEHYDES

John J. Leonard, Springfield, Pa., and Jar-lin Kao, Cherry Hill, N.J., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 1, 1977, Ser. No. 820,996
Int. Cl.[2] C07C *51/32*
U.S. Cl. 562—598 **12 Claims**

1. A process for the preparation of acrylic acid or methacrylic acid which comprises catalytically decomposing the corresponding unsaturated intermediate peroxide compounds peracrylic acid and acrolein monoperacrylate or permethacrylic acid and monopermethacrylate contained in an oxidate solution in the presence of from about 0.01 to about 10.0 **per cent by weight of the oxidate reaction mixture of a tellurium catalyst selected from the group consisting of elemental tellurium tellurium nitrate, sulfate, sulfide, disulfide, dichloride, tetrachloride, tetrafluoride, hexafluoride, dibromide, tetrabromide, tetraiodide, dioxide, and trioxide, tellurium oxychloride, tellurium oxybromide, tellurous acid, telluric acid, methyl telluride, dimethyl telluride, diphenyltelluride, tetraphenyl telluride, diphenyl ditelluride, diethyl ditelluride, dimethyl tellurium dichloride, dibromide, diiodide and difluoride, diphenyl telluroxide, phenyl tellurols,** 2-chlorocyclohexyltellurium trichloride, aluminum telluride, zinc telluride, bismuth telluride, copper telluride, lithium telluride, palladium telluride and lead telluride, at a temperature of from about ambient to about 100° C., said oxidate solution being derived from the liquid phase autoxidation of acrolein or methacrolein, and recovering the acrylic or methacrylic acid.

4,124,634

PROCESS FOR PRODUCING METHACRYLIC ACID FROM ISOBUTYLENE BY TWO STEP OXIDATION

Isao Gotoh; Junji Endoh, both of Yokohama, and Tohru Ueno, Hatano, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 624,646, Oct. 22, 1975, abandoned.
This application Mar. 8, 1977, Ser. No. 775,427
Claims priority, application Japan, Oct. 23, 1974, 49-121510
Int. Cl.[2] C07C *45/04, 51/32*
U.S. Cl. 562—532 **8 Claims**

1. A process for producing methacrylic acid by an oxidation procedure, which comprises:

oxidizing isobutylene in a feed gas at a temperature of 200°–500° C and a pressure of 0.5 to 10 atm over a metal oxide oxidation catalyst suitable for oxidizing isobutylene to methacrolein at a contact time of 0.1–20 seconds in the presence of oxygen as the oxidizing agent and nitrogen as a gaseous diluent, wherein the amount of diluent gas in the feed gas ranges from 50–97 mole percent and wherein the molar ratio of molecular oxygen to isobutylene ranges from 1/3–4/1, such that a methacrolein containing reaction effluent is obtained in which the conversion of said isobutylene is greater than 80%;

simultaneously oxidizing methacrolein in a feed gas over an oxidation catalyst selected from the group consisting of metal oxides, phosphomolybdic acid, and ammonium, bismuth, antimony, potassium, cesium and thallium salts of phosphomolybdic acid, which is suitable for oxidizng methacrolein to methacrylic acid in the presence of oxygen as the oxidizing agent and nitrogen and stream as a gaseous diluent under the reaction conditions specified above for the oxidation of isobutylene, wherein the amounts of said diluent gas and said steam in said feed gas range from 50–97 mole percent and 5–90 mole percent respectively and wherein the amount of oxygen relative to 1 mole of methacrolein ranges from 1.2 to 2.0 moles, so that a methacrylic acid containing reaction effluent is obtained in which the conversion of methacrolein is 40% to less than 80%;

combining both of said reaction effluents;

effecting separation and isolation of methacrolein and methacrylic acid from the combined effluents, wherein the combined effluents are of such a resultant composition that the danger of the formation of an explosive gaseous mixture derived from the oxidation processes in the isolation and separation steps is eliminated; and

returning the isolated methacrolein to the methacrolein oxidation step.

4,124,635

PROCESS FOR THE LIQUID PHASE OXIDATION OF α,β-UNSATURATED ALDEHYDES TO α,β-UNSATURATED ACIDS USING ZINC CATALYSTS

Jar-lin Kao, Cherry Hill, N.J., and John J. Leonard, Springfield, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 7, 1977, Ser. No. 774,845
Int. Cl.[2] C07C *51/32*
U.S. Cl. 562—533 **10 Claims**

1. A process for the liquid phase oxidation of an α,β-unsaturated aliphatic aldehyde containing from 3 to 6 carbon atoms in an inert solvent solution to the corresponding unsaturated aliphatic carboxylic acid which comprises contacting said aldehyde with oxygen or an oxygen-containing gas at a temperature of from about 0° to 100° C. and a pressure between about atmospheric and 1500 psig in the presence of from about 0.00001 to 0.5 mole of a zinc salt catalyst selected from the group consisting of zinc nitrate, zinc chloride, zinc carbonate, zinc bromide, zinc fluoride, zinc hydroxide, zinc sulfate, zinc iodide and zinc oxide or mixtures thereof, per mole of said aldehyde to effect an in situ decomposition of intermediate

peroxide compounds formed during the oxidation to said unsaturated aliphatic carboxylic acid.

4,124,636

METHOD OF PREPARING MONOPOTASSIUM L-MALATE AND ITS MONOHYDRATE

Ichiro Chibata, Suita; Akihiko Sumi, Ashiya, and Osamu Ohtsuki, Nagaokakyo, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Feb. 10, 1978, Ser. No. 876,698
Claims priority, application Japan, Feb. 18, 1977, 52-17511
Int. Cl.[2] C07C *59/22*
U.S. Cl. 562—402 **23 Claims**

1. A method of preparing monopotassium L-malate monohydrate which comprises cooling an aqueous solution of L-malic acid and potassium ion, said solution having a pH of 6.8 or less, to initiate crystallization of a potassium salt of L-malic acid, continuing said crystallization at a pH of 5.3 to 6.8, and recovering the resultant crystals of monopotassium L-malate monohydrate therefrom.

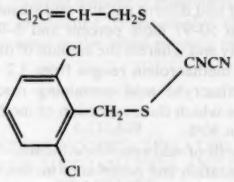
4,124,637

CERTAIN CYANODITHIOIMIDOCARBONATES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 2, 1969, Ser. No. 863,319
Int. Cl.[2] C07C *125/08*
U.S. Cl. 260—551 C **1 Claim**

1. The compound



4,124,638

SOLUBILIZABLE POLYACRYLAMIDE GELS CONTAINING DISULFIDE CROSS-LINKAGES

John N. Hansen, 9794 Cottrell Ter., Silver Spring, Md. 20903

Filed Sep. 12, 1977, Ser. No. 832,385
Int. Cl.[2] C07C *103/153*
U.S. Cl. 260—561 S **1 Claim**

1. A composition of matter having the structure:

$$CH_2{=}CHCONHCH_2CH_2SSCH_2CH_2N\text{-}HOCCH{=}CH_2$$

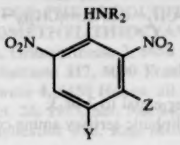
4,124,639

N-ALKOXYALKYL-2,6-DINITROANILINE HERBICIDES

Albert W. Lutz, Princeton, and Robert E. Diehl, Lawrenceville, both of N.J., assignors to America Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 696,085, Jun. 14, 1976, abandoned, which is a continuation-in-part of Ser. No. 599,221, Jul. 25, 1975, abandoned, which is a division of Ser. No. 323,000, Jan. 12, 1973, Pat. No. 3,920,742, which is a continuation-in-part of Ser. No. 262,807, Jun. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 174,938, Aug. 25, 1971, abandoned. This application Dec. 20, 1976, Ser. No. 752,382
Int. Cl.[2] C07C *93/14*; A01N *9/20*
U.S. Cl. 260—573 **18 Claims**

1. A compound of the formula:



wherein

Y is CH_3, C_2H_5, i-C_3H_7, n-C_3H_7, i-C_4H_9, sec-C_4H_9, or Cl

R_2 is secondary C_3–C_4 alkyl monosubstituted with methoxy and

Z is CH_3 or $—CH_2OCH_3$.

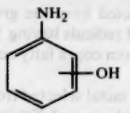
4,124,640

PROCESS FOR PRODUCING ALKOXYANILINES

Akira Shinohara, Shimizu; Kazuhito Akiyama, Shizuoka; Akira Miki, Fuji, and Sadayoshi Matsui, Shimizu, all of Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan

Filed Oct. 28, 1976, Ser. No. 736,335
Claims priority, application Japan, Mar. 1, 1976, 51-21987; Mar. 17, 1976, 51-28995
Int. Cl.[2] C07C *85/24*
U.S. Cl. 260—575 **8 Claims**

1. A process for producing an alkoxyaniline, which comprises: reacting a hydroxyaniline having the formula:



with an alkyl chloride having the formula RCl wherein R represents an alkyl group in the presence of an alkali metal alcoholate or hydroxide in a nonprotonic organic solvent selected from the group consisting of N-dimethylacetamide, tetramethylurea, hexamethylphosphoric triamide, N-methylpyrrolidone and a polyalkyleneglycolalkyl ether having the formula

$$R'O(R''O)_nR'$$

wherein R′ represents an alkyl group having 1 to 4 carbon atoms and R″ represents an alkylene group having 2 to 3 carbon atoms and n is an integer of 1 to 3.

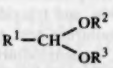
4,124,641

OXYETHYLATED ACETALS

Gerhard W. H. Scherf, Dundas, Canada, assignor to Canadian D. A. Stuart Oil Co. Limited, Scarborough, Canada

Division of Ser. No. 640,273, Dec. 12, 1975, abandoned. This application Jun. 22, 1977, Ser. No. 809,128
Int. Cl.[2] C07C *43/30*; C07D *295/08*
U.S. Cl. 568—601 **6 Claims**

1. A surface active acetal compound having the formula:



wherein at least one of R^1, R^2 and R^3 is an unsubstituted lipophylic alkyl group having from 8 to 24 carbon atoms and at least one of R^1, R^2 and R^3 is a hydrophylic oxyethylated group having the formula $-(C_2H_4O)-_n$ wherein n is an integer of from 1 to 24 bonded to an unsubstituted terminal alkyl group of from 1 to 4 carbon atoms, and wherein R^1, R^2 and R^3 are selected from the group consisting of said unsubstituted lipophylic alkyl group and said hydrophylic oxyethylated group.

4,124,642

6,6,7-TRIMETHYL-TRICYCLO[5.2.2.0^{1,5}]UNDEC-8-EN-2-ONE

George H. Büchi, Cambridge, Mass., and Arnold Hauser, Petit-Lancy, Switzerland, assignors to Firmenich, S.A., Geneva, Switzerland

Filed Sep. 19, 1977, Ser. No. 834,777
Int. Cl.^{2} C07C *49/54*
U.S. Cl. 260—586 G **3 Claims**

1. 6,6,7-Trimethyl-tricyclo[5.2.2.0^{1,5}]undec-8-en-2-one.

4,124,643

PREPARATION OF 3-FLUOROSALICYLALDEHYDE

Michael Martan, Rehovot, Israel, and Dusan J. Engel, Des Plaines, Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 3, 1977, Ser. No. 821,364
Int. Cl.^{2} C07C *45/00*
U.S. Cl. 260—600 R **3 Claims**

1. A process for the preparation of 3-fluorosalicylaldehyde which comprises the steps of:

(a) isomerizing allyl-o-fluorophenol in the presence of a catalyst containing a metal of Group VIII of the Periodic Table at a temperature of from about 175° to about 225° C. to form propenyl-o-fluorophenol;

(b) subjecting said propenyl-o-fluorophenol to ozonolysis at a temperature of from about 0° to about 10° C. in the presence of aqueous acetic acid to form 3-fluorosalicylaldehyde; and

(c) recovering said 3-fluorosalicylaldehyde.

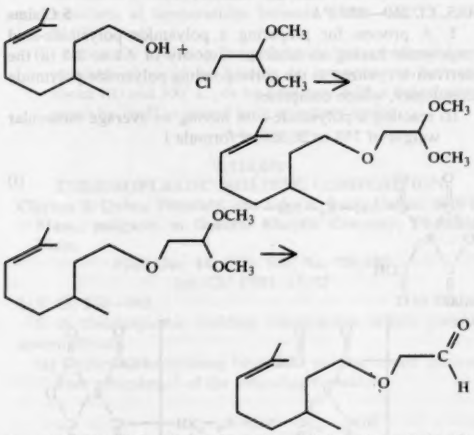
4,124,644

PROCESS FOR PREPARING SUBSTITUTED OXYACETALDEHYDES AND ACETALS THEREOF

Mark A. Sprecker, Sea Bright; John J. Kryschuk, Howell, and John B. Hall, Rumson, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 811,480, Jun. 30, 1977. This application Jan. 11, 1978, Ser. No. 868,726
Int. Cl.^{2} C07C *47/06*
U.S. Cl. 260—602 **2 Claims**

1. A process for preparing citronellyl oxyacetaldehyde according to the reaction sequence:



comprising the steps of (a) intimately admixing citronellol with chloroacetaldehyde dimethyl acetal in the presence of a base and a phase transfer agent which is tricapryl methyl ammonium chloride; the reaction temperature being in the range of from 120° C. up to about 200° C.; the mole ratio of citronellol to chloroacetaldehyde dimethyl acetal being from 0.5:1 up to 2:1; the mole ratio of citronellol to base being between 1:1 and 1:2; the concentration of tricapryl methyl ammonium chloride phase transfer agent in the reaction mass based on amount of chloroacetaldehyde dimethyl acetal being in the range of from 0.5 grams of tricapryl methyl ammonium chloride per mole of chloroacetaldehyde dimethyl acetal up to 25 grams of tricapryl methyl ammonium chloride per mole of chloroacetaldehyde dimethyl acetal; the reaction being carried out in the absence of solvent or in the presence of solvents selected from the group consisting of xylene and decalin; (b) fractionally distilling the resulting product whereby citronellyl oxyacetaldehyde dimethyl acetal is recovered from the distillate; and (c) hydrolyzing the resulting citronellyl oxyacetaldehyde dimethyl acetal with an acid selected from the group consisting of oxyalic acid, dilute aqueous hydrochloric acid, dilute aqueous sulfuric acid and aqueous formic acid.

4,124,645

PROCESS FOR PRODUCING HALOGEN-TERMINATED POLYSULFIDE POLYMERS

Eugene R. Bertozzi, Yardley, Pa., assignor to Thiokol Corporation, Newtown, Pa.

Continuation of Ser. No. 333,932, Feb. 20, 1973, abandoned. This application Sep. 28, 1977, Ser. No. 837,116
Int. Cl.^{2} C07C *149/12*
U.S. Cl. 260—608 **16 Claims**

13. In a method for preparing a polysulfide polymer having a backbone of substantially the general formula

$$-CH_2CH_2OCH_2OCH_2CH_2S_x-_n$$

where n is in the range of 2,000 to 4,000 **l and** x is an integer from 2 to 5, wherein a chlorine terminated component is reacted with a compound of the formula Na_2S_x where x is an integer from 2 to 5, the improvement which comprises using as the chlorine terminated component, the product obtained by polymerizing a polythiodiglycol in the presence of formaldehyde at a temperature of 60 to 140° C. in the presence of a Lewis acid catalyst and replacing terminal hydroxyl groups with an ethylene halohydrin.

4,124,646

PROCESS FOR PRODUCING THIOANISOLE

Masao Kawamura, Akashi; Masakazu Hatta, Kakogawa; Nobuhiro Koune, Kobe, and Nobuyuki Kitagishi, Takasago, all of Japan, assignors to Seitetsu Kagaku Co., Ltd., Japan

Filed Nov. 1, 1976, Ser. No. 737,623
Claims priority, application Japan, Nov. 5, 1975, 50/133345; Dec. 5, 1975, 50/145280
Int. Cl.^{2} C07C *148/00*
U.S. Cl. 260—609 E **6 Claims**

1. A process for producing thioanisole which comprises reacting phenyl mercaptan with at least one alkylating agent selected from the group consisting of methyl alcohol, dimethyl ether, methyl mercaptan, and dimethyl sulfide wherein both said phenyl mercaptan and said alkylating agent are in the gaseous phase in the presence of a catalyst selected from the group consisting of alumina, alumina-silica, silica and activated carbon for producing said thioanisole at an elevated temperature.

4,124,647

PROCESS FOR THE PREPARATION OF ETHERS

Gary B. McVicker, Westfield, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 166,615, Jul. 27, 1971, abandoned, which is a continuation-in-part of Ser. No. 51,669, Jul. 1, 1970, abandoned. This application May 23, 1977, Ser. No. 799,588
Int. Cl.^{2} C07C *41/10*
U.S. Cl. 568—671 **14 Claims**

1. A process for the preparation of ethers which comprises: (A) contacting carbon monoxide with at least one C_1 to C_{20} alkanol at a temperature in the range from about 150° to

about 400° C. and at a carbon monoxide partial pressure in the range from about 200 to about 1000 psig in the presence of a catalyst system having the general formula:

$$B_xMe[Me'(CO)_a(L)_b]_2$$

and an iodine containing cocatalyst in cocatalyst to catalyst molar ratio ranging from about 16 to about 100, wherein B is a Lewis base capable of coordinating with a Group IIA metal, Me′ is a transition metal selected from the group consisting of metals of Groups VIB and VIIB and VIII of the Periodic Table of Elements, Me is a Group IIA metal, L is a uni- or polydentate ligand or hydrocarbon capable of coordinating with said transition metal; x is a positive integer ranging from 1 to 4; a is a positive integer ranging from 1 to 5 and b is an integer ranging from 0 to 4, with the proviso that the sum of a and b is 5 or less; and

(B) obtaining at least one ether reaction product from said process.

4,124,648

PROCESS FOR THE PREPARATION OF NORPATCHOULENOL AND INTERMEDIATES THEREFOR

Pierre Pesnelle, Le Cannet, and Paul J. Teisseire, Grasse, both of France, assignors to Societe Anonyme des Etablissements Roure-Bertrand Fils & Justin Dupont, Paris, France

Filed Feb. 21, 1974, Ser. No. 444,488

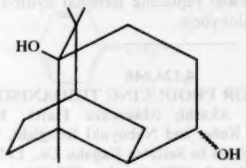
Claims priority, application Switzerland, Feb. 28, 1973, 2885/73

Int. Cl.² C07C *29/00*

U.S. Cl. 568—817 **2 Claims**

1. A process for the preparation of norpatchoulenol, which comprises dehydrating a glycol of the formula

XII



4,124,649

HYDROCARBON DEHYDROGENATION METHOD

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 571,338, Apr. 24, 1975, Pat. No. 4,008,180, which is a continuation-in-part of Ser. No. 480,793, Jun. 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, Jul. 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, Mar. 17, 1969, Pat. No. 3,740,328. This application Nov. 15, 1976, Ser. No. 742,167

Int. Cl.² C07C *15/00*; C07B *3/00*

U.S. Cl. 260—666 A **26 Claims**

1. A method for dehydrogenating a dehydrogenatable hydrocarbon comprising contacting said hydrocarbon, at dehydrogenation conditions, with a catalytic composite consisting essentially of a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, and about 0.01 to about 5 wt. % tin, wherein substantially all of the platinum or palladium, rhodium, and tin are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state, and wherein substantially all of the tin component is present in an oxidation state above that of the elemental metal and in a particle size which is less than 100 Angstroms in maximum dimension.

4,124,650

PROCESS FOR THE PRODUCTION OF LOW POUR POINT SYNTHETIC OILS

Christopher Olavesen; Bruce M. Sankey, and John B. Gilbert, all of Sarnia, Canada, assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Jul. 22, 1977, Ser. No. 818,101

Int. Cl.² C07C *9/14*

U.S. Cl. 260—676 R **18 Claims**

1. An improved process for producing low pour point synthetic oils from feedstocks containing wax and residual olefinic unsaturation, said feedstocks having been obtained by thermally and non-catalytically polymerizing a mixture of linear C_6–C_{20} carbon atom monoalpha-olefins, wherein the improvement comprises simultaneously hydrogenating and catalytically dewaxing said feedstock by contacting same and hydrogen with a catalyst comprising a hydrogen form mordenite at elevated temperature ranging from between about 450° to 950°F. and at elevated pressure, thereby producing a synthetic oil of reduced wax content and pour point.

4,124,651

PROCESS FOR THE PRODUCTION OF POLYAMIDE-POLYAMIDE-ACID COPOLYMERS

Dieter Lohmann, Pratteln; Peter Furrer, Bottmingen; Roland Darms, Therwil, and Gerd Greber, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 719,319, Aug. 31, 1976, abandoned, which is a continuation of Ser. No. 552,824, Feb. 25, 1975, abandoned, which is a continuation-in-part of Ser. No. 384,644, Aug. 1, 1973, abandoned. This application Aug. 17, 1977, Ser. No. 825,324

Claims priority, application Switzerland, Aug. 25, 1972, 12657/72

The portion of the term of this patent subsequent to Jul. 8, 1992, has been disclaimed.

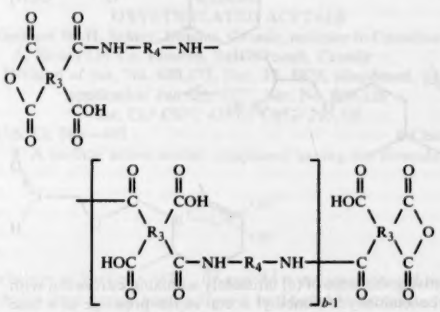
Int. Cl.² C08G *73/14*

U.S. Cl. 260—857 PA **5 Claims**

1. A process for preparing a polyamide/polyamide-acid copolymer having an inherent viscosity of 0.1 to 2.5 or the derivative cyclized to the corresponding polyamide-polyimide copolymer, which comprises

(i) reacting a polyamide-acid having an average molecular weight of 750 to 20,000 of formula I

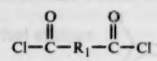
(I)



with a diamine of formula II

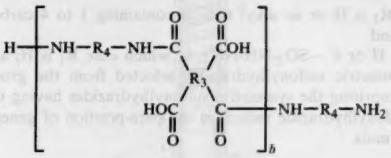
$$H_2N—R_2—NH_2$$

and with a dicarboxylic acid dichloride of formula III



(III),

in a molar ratio of 1 to a to $a-1$, or reacting a polyamide-acid having an average molecular weight of 750 to 20,000, of formula IV



(IV)

with a dicarboxylic acid dichloride of formula III and with a diamine of formula II, in a molar ratio of 1 to a to $a-1$, in which formulae I to IV a represents an integer from 8 to 100, and b represents an integer from 2 to 100,

with the proviso that, when b represents an integer from 8 to 100, a represents an integer at least equal to b, R_2 and R_4 independently of one another denote a monocyclic aromatic radical which may be substituted by alkyl or alkoxy groups each having 1 to 4 carbon atoms, or an uncondensed bicyclic aromatic radical which may be substituted by alkyl or alkoxy groups each having 1 to 4 carbon atoms, and in which the aromatic nuclei are bonded to one another through the bridging member —O— or —CH_2—; R_1 denotes an unsubstituted monocyclic aromatic radical, with the carbonyl groups being bonded to different carbon atoms; and R_3 represents an unsubstituted monocyclic, a condensed polycyclic or an uncondensed bicyclic aromatic radical in which bicyclic aromatic radical the aromatic nuclei are bonded to one another through the bridging member —O— or —CO—, wherein the carbonyl and carboxyl groups are bonded to different ring carbon atoms and adjoin each other in pairs and the carbonyl groups of the anhydride end groups are located on adjacent ring carbon atoms, in an anhydrous organic aprotic solvent or a mixture of such solvents, with the exclusion of moisture, at temperatures between about −20° C. and +50° C., and

(ii) optionally cyclizing the polyamide/polyamide-acid copolymer obtained by heating to temperatures between about 100 and 300° C., or by treatment with a dehydrating agent by itself or mixed with a tertiary amine.

4,124,652

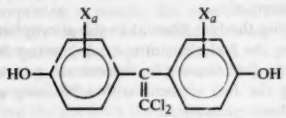
THERMOPLASTIC MOLDING COMPOSITION

Clayton B. Quinn, Pittsfield, and John A. Rock, Dalton, both of Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 14, 1976, Ser. No. 750,555
Int. Cl.[2] C08L *67/02*
U.S. Cl. 260—860 **11 Claims**

1. A thermoplastic molding composition which consists essentially of:

(a) a chlorine containing bisphenol polycarbonate derived from a bisphenol of the following formula:



wherein X is independently selected from halogen or an alkyl radical of 1 to 4 carbon atoms and a is an integer of 0 to 4;

(b) a polyester polymer derived from cyclohexanedimethanol and hexacarbocyclic dicarboxylic acid.

4,124,653

ELASTOMER BLEND

Kenneth H. Whitlock, Hemel Hempstead, England, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 12, 1977, Ser. No. 859,970
Claims priority, application United Kingdom, Dec. 14, 1976, 52161/76
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—873 **8 Claims**

1. An elastomeric blend of (A) a butadiene/acrylonitrile copolymer and (B) a copolyetherester consisting essentially of 15–95% by weight of short chain ester units derived from a dicarboxylic acid and having a molecular weight not greater than 300 and a diol having a molecular weight not greater than 250, and 5–85% by weight of long chain ester units derived from a dicarboxylic acid having a molecular weight not greater than 300 and a poly(alkylene oxide)glycol having a number average molecular weight of 400–6000, said copolyetherester having a melting point of at least 100° C.; the blend containing from 1–50% by weight of component (A).

4,124,654

THERMOPLASTIC MOLDING COMPOSITIONS OF VINYL AROMATIC COMPOUND ALPHA, BETA UNSATURATED CYCLIC ANHYDRIDE COPOLYMERS

Visvaldis Abolins, Delmar, and Gim F. Lee, Jr., Albany, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Jun. 7, 1974, Ser. No. 477,435
Int. Cl.[2] C08L *53/02*
U.S. Cl. 260—876 B **12 Claims**

1. A thermoplastic molding composition which comprises:

(a) from 40–95 parts by weight of a copolymer of a vinyl aromatic compound and an α,β-unsaturated cyclic anhydride;

(b) from 10–50 parts by weight of a hydrogenated block copolymer of the A-B-A type wherein prior to hydrogenation; A is a polymerized mono-alkenyl aromatic hydrocarbon block; B is a polymerized conjugated diene hydrocarbon block; the blocks A constituting 2–50 weight percent of the copolymer; and,

(c) from 0–50 parts by weight of a polyphenylene ether resin.

4,124,655

ELECTRICAL INSULATING COMPOSITIONS BASED ON ETHYLENE/VINYL ACETATE COPOLYMERS

Ernst Koehnlein; Rudolf Glaser, both of Ludwigshafen, and Ludwig Koessler, Gruenstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 11, 1977, Ser. No. 758,434
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1976, 2602689
Int. Cl.[2] C08F *263/04*; C08K *5/34*
U.S. Cl. 260—878 R **1 Claim**

1. An electrical insulating composition consisting of

(A) an ethylene/vinyl acetate copolymer which consists of, as copolymerized units, from 99.5 to 90.5 percent by weight of ethylene and from 0.5 to 9.5 percent by weight of vinyl acetate, the sum of the percentages by weight being 100 and the melt index of the copolymer being from 0.2 to 5 g/10 min.,

(B) from 0.1 to 2.0 percent by weight, based on A), of polymerized 2,2,4-trimethyl-1,2-dihydroquinoline having a softening point of from 108 to 118° C.,

(C) from 0.5 to 5 percent by weight, based on A), of triallyl cyanurate, and

(D) from 0 to 0.1 percent by weight, based on A), of sulfur.

4,124,656

PROCESS FOR THE BULK POLYMERIZATION OF ALKENYLAROMATIC COMPOUNDS

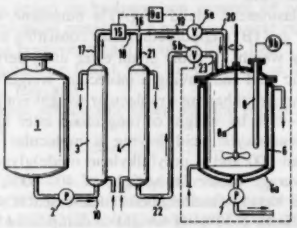
Wilfried Walkenhorst, Liederbach, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt (Main), Fed. Rep. of Germany

Filed Jun. 16, 1977, Ser. No. 807,320

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1976, 2627336

Int. Cl.[2] C08F *253/00, 255/06, 279/02, 12/08*

U.S. Cl. 260—878 R 13 Claims



1. A process for making polymers of alkenylaromatic and alkenylcycloaliphatic monomeric compounds in a heated agitated continuous polymerization vessel to which one or more monomers are continuously fed and from which a polymeric product is continuously withdrawn which comprises heating a first stream of feed monomer to an elevated temperature, dividing said heated first stream into a second and third stream, introducing said second stream into said vessel, cooling said third stream to a temperature below the desired polymerization temperature and thereafter introducing it into said vessel and regulating the relative flow rates of said second and third streams to maintain the polymerization temperature in said vessel substantially at a desired value.

4,124,657

ROOM TEMPERATURE CURED ELASTOMER

Eugene C. Martin, and Arnold Adicoff, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1977, Ser. No. 781,098

Int. Cl.[2] C08F *8/00, 8/02*

U.S. Cl. 260—879 1 Claim

1. The derivative produced by reacting hydroxy ter .inated polybutadiene with naphthyl-potassium in dimethoxyethane to form a first product and then reacting said first product with 1-bromo-2,4-pentadiene.

4,124,658

DEVOLATILIZATION OF STYRENE POLYMERS WITH SULFONYLHYDRAZIDES

Philippe J. A. Camerman, Wezembeek-Oppem, Belgium, assignor to Cosden Technology, Inc., Big Spring, Tex.

Filed Oct. 20, 1977, Ser. No. 843,845

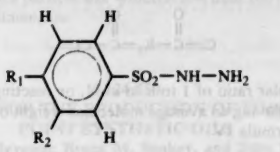
Claims priority, application United Kingdom, Oct. 21, 1976, 43757/76

Int. Cl.[2] C08F *6/00*

U.S. Cl. 260—880 R 12 Claims

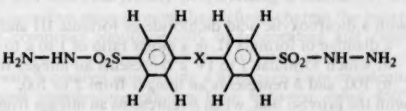
1. A process for removing residual monomer from styrene based polymers selected from the group consisting of styrene homopolymers and copolymers, which comprises the steps of:

(a) adding a sulfonylhydrazide to the polymer selected from the group consisting of: asymmetric sulfonylhydrazides of the general formula:

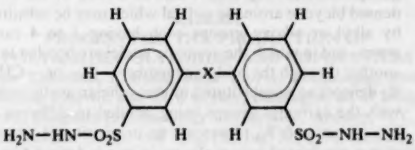


where R_1 is H or an alkyl radical containing 1 to 4 carbon atoms and

R_2 is H or a $-SO_2$-NH-NH_2, in which case R_1 is H; and symmetric sulfonylhydrazides selected from the group comprising the symmetric sulfonylhydrazides having the sulfonylhydrazide radical in the para-position of general formula



and the symmetric sulfonylhydrazides having the sulfonylhydrazide radical in the meta position of general formula



where X is —0—, —S—, $-CH_2-$ or SO_2— and mixtures thereof; and

(b) heating the mixture to a temperature above the decomposition temperature of the sulfonylhydrazide used.

4,124,659

GETTERING IN NUCLEAR FUEL ELEMENTS

Paolo della Porta; Tiziano A. Giorgi, and Livio Rosai, all of Milan, Italy, assignors to S.A.E.S. Getters S.p.A., Milan, Italy

Continuation of Ser. No. 465,662, Apr. 30, 1974, abandoned. This application Oct. 12, 1976, Ser. No. 731,805

Claims priority, application Italy, May 2, 1973, 23613 A/73

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.[2] G21C *21/00*

U.S. Cl. 264—0.5 7 Claims

1. A method of manufacturing a nuclear fuel element comprising the steps of

(A) pumping the fuel element to sub-atmospheric pressure

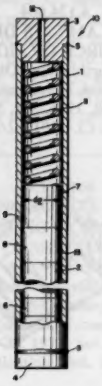
(B) heating the fuel element to a temperature below that at which the fuel element walls commence to sorb gas

(C) filling the fuel element with a washing gas to about atmospheric pressure

(D) pumping the fuel element to sub-atmospheric pressure

(E) inserting a non-evaporable activated getter material into the nuclear fuel element

(F) filling the fuel element with helium to super-atmospheric pressure
(G) sealing the fuel element



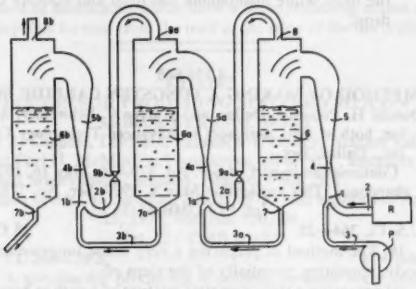
(H) heating the fuel element and getter material to a temperature below that at which the fuel element walls commence to sorb gas.

4,124,660

PROCESS AND APPARATUS FOR MIXING GASES AND LIQUIDS

Jacques Sterlini, Paris, France, assignor to CEM-Compagni Electro-Mecanique, Paris, France

Filed Jun. 21, 1976, Ser. No. 697,922
Claims priority, application France, Aug. 25, 1975, 75 26157
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—21 **4 Claims**



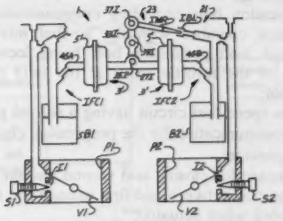
1. A process to implement intimate contact between a gas and a liquid, which comprises the following stages:
(a) forming an emulsion of the gas in the liquid, said liquid being raised to a pressure p_1 and circulating at a speed V, thereby obtaining fine bubbles which are uniformly distributed in said circulating liquid;
(b) expanding the emulsion formed in stage (a) to pressure p_2 less than p_1 by causing the same to pass into an expansion zone comprising a nozzle, the emulsion thereby being simultaneously accelerated while intimate contact between the gas and the liquid is ensured;
(c) compressing the emulsion by decreasing its speed in a hydrodynamic diffusor, and
(d) separating the gas from the liquid in a pressurized vessel the volume of which is such that the dwell time of the liquid having dissolved part of the gas suffices to ensure the desired contact between gas and liquid.

4,124,661

FUEL FLOW BALANCING APPARATUS

John L. Niebrzydoski, Florissant, Mo., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Nov. 25, 1977, Ser. No. 854,653
Int. Cl.[2] F02M *7/24*
U.S. Cl. 261—23 A **17 Claims**



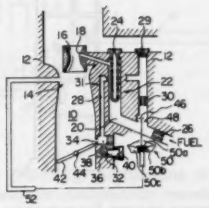
1. In a carburetor for an internal combusion engine, said carburetor having at least two air passageways through which air is drawn into the engine, at least one fuel circuit for each passageway through which fuel is drawn from a source thereof into said passageway and mixed with air passing therethrough to produce an air-fuel mixture combusted in said engine, the amount of fuel flowing through each fuel circuit being a function of the sub-atmospheric air pressure level to which each said fuel circuit is subjected, the improvement comprising: apparatus for balancing the fuel flow in said fuel circuits including means for sensing the pressure level in each fuel circuit, the pressure levels in said fuel circuits differing as a result of the flow characteristics thereof, means for introducing air into one of the fuel circuits to modulate the quantity of fuel flowing therethrough, and means responsive to the sensing means for controlling the amount of air introduced into said one fuel circuit as a function of the difference between the sensed pressure levels in said fuel circuits whereby the quantity of fuel drawn through said one fuel circuit is adjusted until it substantially equals the amount of fuel drawn through the other fuel circuit so the resulting air-fuel ratios of the mixtures produced in the respective air passageways are substantially equal.

4,124,662

CARBURETOR AND METHOD OF OPERATING SAME

Hideo Morita, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan

Continuation of Ser. No. 572,065, Apr. 28, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 736,078
Claims priority, application Japan, May 2, 1974, 49-49520
Int. Cl.[2] F02M *3/02*
U.S. Cl. 261—41 D **3 Claims**



1. A carburetor for use in an internal combustion engine comprising:
means defining an air-fuel mixture induction passage for supplying an air-fuel mixture to the engine, said air-fuel mixture induction passage including a venturi portion;
a throttle valve in said air-fuel mixture induction passage;
means defining a main fuel circuit;

a main discharge nozzle of the main fuel circuit opening upstream of the throttle valve disposed within said air-fuel mixture induction passage of the carburetor;

means defining a low-speed circuit;

said main fuel circuit having a first passage providing in use communication for the main discharge nozzle with a fuel source;

a progression chamber in the low-speed circuit, having a progression hole providing communication of the progression chamber with the air-fuel mixture induction passage, said progession hole being located above the edge of the throttle valve at the fully closed position thereof;

said low-speed fuel circuit having a second passage providing communication for the progression chamber with said first passage;

valve means for closing said second passage to block communication between said first passage and the progression chamber when actuated;

a diaphragm-actuator for actuating said valve means upon having a venturi vacuum signal applied thereto corresponding to a high engine speed and load operation condition; and

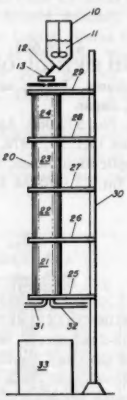
conduit means defining a passage for providing communication for said diaphragm-actuator with the venturi portion of said air-fuel mixture induction passage for applying to said diaphragm-actuator the venturi vacuum signal generated at the venturi portion, said passage being formed separate and independent from the main discharge nozzle and said first passage of said main fuel circuit and said second passage of said low-speed fuel circuit.

4,124,663

CONTINUOUS PROCESS FOR PELLETING EXPLOSIVE COMPOSITIONS

Charles D. Brumley, Greeneville; Alex Fancher, Jr., and Paul L. Lee, both of Kingsport, all of Tenn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 7, 1977, Ser. No. 840,337
Int. Cl.[2] C06B *21/00*
U.S. Cl. 264—3 D **6 Claims**



1. A continuous process for preparing solid pellets from a molten explosive material, which comprises:

a. introducing a stream of the molten explosive material into a high velocity jet of inert gas to atomize said stream into finely divided liquid droplets;

b. allowing the liquid droplets to fall through a vertical tower;

c. introducing a current of an inert gas upwardly through the tower to cool said droplets to form solid pellets during their fall through said tower, and

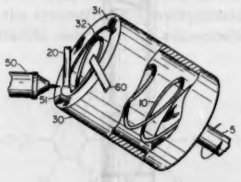
d. discharging said pellets from the bottom of said tower.

4,124,664

FORMATION OF FILAMENTS DIRECTLY FROM AN UNCONFINED SOURCE OF MOLTEN MATERIAL

Robert E. Maringer, Worthington, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

Filed Nov. 30, 1976, Ser. No. 746,096
Int. Cl.[2] B01J *2/02*
U.S. Cl. 264—8 **14 Claims**



1. A method of making filamentary material, comprising the steps of:

(a) heating a solid material so as to form a pendant molten drop of the material which is at a temperature within 25 percent of its equilibrium melting point in ° K, said molten material having a surface tension of 10 to 2500 dynes/cm. and a viscosity of 0.001 to 1.0 poise at said temperature;

(b) rotating a hollow cylindrical member about its longitudinal axis at a peripheral speed in excess of 3 feet per second, said member having a circumferential, heat-extracting lip projecting from its inner periphery, and said lip having a narrow peripheral edge of arcuate cross section; and,

(c) bringing the surface of said pendant molten drop and said peripheral edge of the heat-extracting lip into contact so as to spontaneously withdraw a solidifying filament from the drop while maintaining the form and stability of the drop.

4,124,665

METHOD OF MAKING A TUNGSTEN CARBIDE BODY

Donald H. Petersen, Dallas, and Warren C. Schwemer, Arlington, both of Tex., assignors to Advanced Technology Center, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 470,426, May 16, 1974, abandoned. This application Mar. 8, 1977, Ser. No. 775,668
Int. Cl.[2] C04B *35/56*
U.S. Cl. 264—28 **18 Claims**

18. The method of preparing a very dense tungsten carbide body, consisting essentially of the steps of:

(a) preparing a stoichiometric mixture of a carbon precursor and finely powdered tungsten, wherein the carbon precursor is a vinylidene chloride-based polymeric material, the carbon precursor being a precursor of a quantity of carbon which is in substantially stoichiometric ratio to the metallic tungsten;

(b) blending the mixture to obtain an intimate and uniform mixture of the carbon precursor and powdered metal;

(c) removing moisture, if any, which has accumulated upon particles of the mixture;

(d) compressing the mixture to form a self-supporting green body of a desired shape;

(e) heating the green body to a temperature at which significant dehydrohalogenation begins;

(f) subsequently heating the green body at a uniform and slow rate to accomplish significant dehydrohalogenation without polymeric material melting or puffing, until at least 20% of the polymeric material has decomposed;

(g) further heating the green body in order to remove such

metal oxides as are present, with removal being accomplished by the formation of volatile tungsten oxychlorides and chlorides, with said heating being gradual enough such that the temperature differential within the body is held to no more than 5° C., until a weight loss of approximately 50% of the polymeric material has been achieved;

(h) further heating the body at an average rate no greater than about 50° C. per hour to a temperature within the range of about 800°–1050° C.; and

(i) subsequently densifying the body by heating the body at about 2,000° C. for about 10 minutes in an inert or evacuated environment.

4,124,666

METHOD OF KEEPING NOZZLE BODIES OR BREAKER PLATES CLEAN DURING EXTRUSION OF POLYMER MELTS

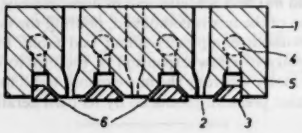
Gerd Wilhelm, Neuss; Artur Jäschke, Cologne; Hans-Jürgen Simon, Dormagen; Jens Schmidt, Neuss, and Surinder S. Sandhu, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jun. 29, 1977, Ser. No. 811,314

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1976, 2630055

Int. Cl.[2] D01D *1/10*

U.S. Cl. 264—39 **11 Claims**



1. Method of keeping nozzle bodies or breaker plates clean during extrusion of polymer which can be shaped from the melt which comprises preventing the formation of deposits near the nozzle orifices by gassing these orifices at the point of extrusion of the melt, said gas consisting entirely or partly of vapours of substances which have a depolymerising action on the deposits formed from the melt at the edge of the die orifice.

4,124,667

PROCESS FOR PRODUCING SINTERED SILICON CARBIDE CERAMIC BODY

John A. Coppola, Lewiston; Laurence N. Hailey, Niagara Falls, and Carl H. McMurtry, Youngstown, all of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Division of Ser. No. 584,226, Jun. 5, 1975. This application Apr. 25, 1977, Ser. No. 790,354

Int. Cl.[2] C04B *35/52*

U.S. Cl. 264—29.5 **17 Claims**

1. A process for producing a sintered ceramic body, comprising the steps of:

(a) mixing together a raw batch comprising:

(i) from about 91 to about 99.35 parts by weight alpha silicon carbide and having a surface area of from about 1 to about 100 m^2/g;

(ii) from about 0.67 to about 20 parts by weight of a carbonizable, organic solvent soluble, organic material having a char yield of from about 25 to about 75% by weight;

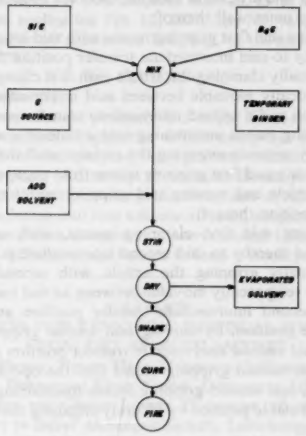
(iii) from about 0.15 to about 5 parts by weight of a boron source containing from about 0.15 to about 3.0 parts by weight boron; and

(iv) from about 5 to about 15 parts by weight of temporary binder;

(b) adding to the raw batch from about 25 to about 100% by weight of the raw batch of an organic solvent in which the carbonizable, organic solvent soluble, organic material is soluble;

(c) stirring the raw batch and organic solvent in such a way as to disperse the carbonizable, organic solvent soluble, organic material about the silicon carbide of the raw batch;

(d) drying the stirred mixture in such a way as to evaporate the organic solvent from the mixture;



(e) shaping the dried mixture in such a way as to produce a shaped body having a density of at least about 1.60 g/cc;

(f) curing the temporary binder within the shaped body; and

(g) firing the shaped body for such time, at such temperature and in such environment as to produce a density of at least about 2.40 g/cc.

4,124,668

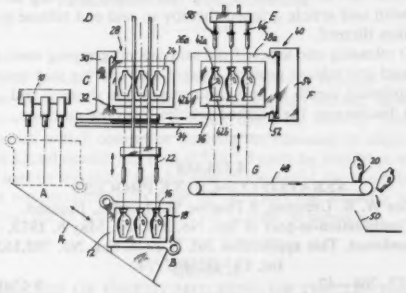
PROCESS FOR THE REMOVAL AND AFTER TREATMENT OF BLOWN HOLLOW BODIES OF PLASTIC

Walter Frohn, Munich, Fed. Rep. of Germany, assignor to Bell Maschinenfabrik AG, Kriens, Lucerne, Switzerland

Filed Oct. 7, 1976, Ser. No. 730,759

Int. Cl.[2] B29C *17/07, 17/12*

U.S. Cl. 264—40.1 **14 Claims**



1. A method for removing and finishing of blown hollow articles made of plastic in machines for manufacturing blown plastic articles, the machines being provided with at least one blow mold closing unit movable between a hose transfer position, in which position said blow mold closing unit receives plastic hose pieces, and a removal position, in which at least one hose piece is blown into a hollow article having a calibrated opening, and with at least one finishing station for the blown hollow article, comprising the steps of:

(a) internally gripping the blown hollow article disposed in

said blow molding closing unit with first gripping means reciprocally movable between an end engaging position, an intermediate transfer position and an end rest position, by moving said first gripping means into said end engaging position thereof and inserting said first gripping means into the opening of said article, said gripping means maintaining said articles in a stable position by securely engaging the inner wall thereof;

(b) moving said first gripping means with said article gripped thereby to said intermediate transfer position thereof;

(c) externally clamping the article with first clamping means reciprocally movable between said intermediate transfer position and a second intermediate transfer position, said clamping means maintaining said article in a stable position by securely engaging the exterior wall thereof;

(d) releasing said first gripping means from engagement with said article and moving said gripping means to said end rest position thereof;

(e) moving said first clamping means, with said article gripped thereby to said second intermediate position;

(f) internally gripping the article with second gripping means reciprocally movable between an end rest position, said second intermediate transfer position and an end release position, by moving said second gripping means into said second intermediate transfer position and inserting said second gripping means into the opening of said article, said second gripping means maintaining said article in a stable position by securely engaging the inner wall thereof;

(g) releasing said first clamping means from engagement with said article and moving said first clamping means to said intermediate transfer position thereof;

(h) externally clamping said article with second clamping means, disposed at said second intermediate transfer position, said second clamping means maintaining said article in a stable position by securely engaging the exterior wall thereof;

(i) releasing said second gripping means from engagement with said article and moving said second gripping means to said end rest position thereof;

(j) performing a finishing operation on said article by means of finishing tools at said second intermediate position;

(k) moving said second gripping means from said end rest position to said second intermediate transfer position and internally gripping said article by said second gripping means;

(l) releasing said second clamping means from engagement with said article and moving said second gripping means with said article gripped thereby to said end release position thereof;

(m) releasing said article from said second gripping means at said end release position thereof and moving said second gripping means to said end rest position thereof; and

(n) discharging the finished articles from the machine.

4,124,669

AERATED CONCRETE PROCESS

Charles W. B. Urmston, 9 Thurloe St., London, England

Continuation-in-part of Ser. No. 358,436, May 8, 1973, abandoned. This application Jul. 7, 1976, Ser. No. 703,163

Int. Cl.[2] B28B *1/14*

U.S. Cl. 264—42 **9 Claims**

1. A process of producing lightweight concrete units which comprises the steps of:

making a dry mixture of aluminium powder, alkali, catalyst for aeration and metal soap;

introducing the mixture into water at a temperature in the range of 35°–75° C.;

making a mix including Portland cementitious material and fine aggregate, and said water containing said mixture, the water containing said mixture being added to the mix immediately after introduction thereto of said mixture;

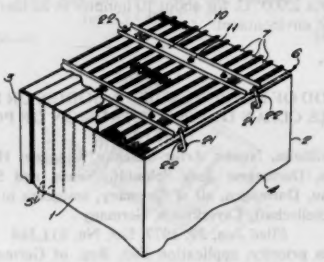
introducing coarse aggregate into said mix after aeration of the mix has begun and continuing mixing only for such time as to achieve homogeneity;

placing said mix into a mold;

allowing the mix to said in the mold;

stripping the mold and autoclaving to cure the unit;

the improvement comprising employing a mold characterised by imperforate vertical sides, imperforate vertical ends, an imperforate base and a perforated closure over the whole area of the top of the mold with semi-porous



filter material under said closure, to allow gas and liquid, but not solids to escape through said closure;

immediately after the introduction of said coarse aggregate into said mix and achievement of homogeniety, but before aeration of the mix is completed, pouring the mix into said mold without completely filling said mold, but filling it sufficiently to allow expansion of the mix to completely fill the mold, whereby the mix expands to fill the mold and sets under pressure produced by its own aeration.

4,124,670

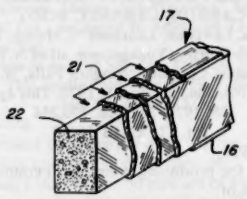
METHOD OF PRODUCING A COMPOSITE HIGH STRENGTH TO WEIGHT STRUCTURE HAVING A SHELL AND WEIGHT CONTROLLED CELLULAR CORE

Andrew M. Cecka, Thousand Oaks, and Paul G. Pawling, Oxnard, both of Calif., assignors to Fansteel Inc., North Chicago, Ill.

Filed Jul. 7, 1976, Ser. No. 703,137

Int. Cl.[2] B29D *27/00*

U.S. Cl. 264—45.3 **13 Claims**



1. In a method of producing a structural member of high strength to weight ratio comprising preparing an elongated core strip comprising a foamable resin composition, forming a shell by wrapping said core strip with at least one layer of unidirectionally oriented resin-coated graphite fibers in sheet form, inserting said wrapped core strip into a mold cavity of smaller cross-sectional area than the cross-sectional area of said core strip would be if said core strip were permitted free expansion, sealing said mold cavity, activating said foamable resin composition to cause expansion thereof and generate pressure within said mold cavity pressing said core strip against said shell and thereby providing intimate bonding of said core strip to said shell, and thereafter removing said core strip and said bonded shell from said mold cavity as an integral composite structure, the improvement wherein said foamable

resin composition contains from about 30 to about 80 volume percent of chopped cork and from zero to about 60 weight percent of a high density weight control material having a density in excess of about 4.

4,124,671

METHOD FOR STRENGTHENING PZT TRANSDUCERS

Basil E. Walker, Oxon Hill, Md.; Robert C. Pohanka, Springfield, and Roy W. Rice, Alexandria, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 25, 1975, Ser. No. 635,020

Int. Cl.[2] C04B *35/26*

U.S. Cl. 264—85 **5 Claims**

1. A method of strengthening lead zirconate-lead titanate ceramic transducers which comprises heating said transducer in a nonreducing inert atmosphere containing at least 20 volume percent of oxygen at a temperature from about 900° C. to about 1000° C. for at least 1 hour.

4,124,672

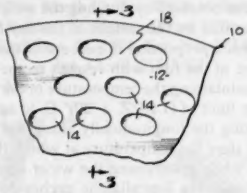
REPLICATION UTILIZING A CASTING PROCESS

Manfred H. Jarsen, Encino, Calif., assignor to MCA Disco-Vision, Inc., Universal City, Calif.

Continuation of Ser. No. 406,686, Oct. 15, 1973, abandoned. This application Dec. 22, 1976, Ser. No. 753,183

Int. Cl.[2] B29D *17/00, 19/02;* B29F *5/00*

U.S. Cl. 264—129 **17 Claims**



1. A process for producing a disc-shaped record comprising the steps of:

forming a master matrix carrying information represented as a series of surface discontinuities arranged in a track-like fashion, and each discontinuity having a constant dimension in the radial direction and a constant maximum dimension in the direction perpendicular to said surface; the length of each discontinuity in the circumferential direction and the distance between adjacent discontinuities in the circumferential direction representing the stored information;

forming a negative mold having an upper surface carrying the video information in a form complementary to the information bearing surface of the matrix;

said upper surface of the mold being formed with a pattern of surface discontinuities separated by flat surface portions of said upper surface;

making a replica disc in said mold;

removing the replica disc having a planar surface exhibiting a pattern of discontinuities arranged identical to the information track carried by the master matrix;

forming a reflective coating over the planar surface of the replica including the pattern of discontinuities carried thereby; and

forming a protective coating of transparent material over the reflective coating.

4,124,673

PROCESS FOR THE PRODUCTION OF BIFILAR ACRYLIC FIBRES

Christian Pieper, Neuss; Karlheinz Feltgen, and Alfred Nogaj, both of Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 669,696, Mar. 23, 1976, abandoned. This application Feb. 15, 1977, Ser. No. 768,852

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1975, 2513251

Int. Cl.[2] B29F *3/10*

U.S. Cl. 264—171 **12 Claims**

1. A process for the production of bifilar fibres and filaments from an acrylonitrile polymer which comprises preparing a solution from that polymer in a solvent selected from the group consisting of dimethyl formamide, dimethyl acetamide, dimethyl sulfoxide and butyrolactone, and dividing up the resulting solution into two solution streams, subjecting both of these two solution streams to a conventional bifilar spinning process at different temperatures to form a bicomponent fiber.

4,124,674

PROCESS FOR REMOVING RESIDUAL SOLVENT FROM DRY-SPUN FILAMENTS

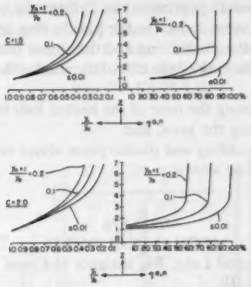
Christian Pieper, Neuss; Hans Uhlemann, Solingen; Karlheinz Feltgen, Dormagen; Klaus Nickel, Dormagen; Alfred Nogaj, Dormagen, and Günter Lorenz, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sep. 15, 1976, Ser. No. 723,581

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1975, 2541335

Int. Cl.[2] D01F *6/18*

U.S. Cl. 264—233 **6 Claims**



1. A process for continuously removing residual solvent from filaments of dry-spun acrylonitrile polymers to values of below 2% by weight of solvent, based on the dry filament material, which comprises washing the filaments in stages but with a total quantity of from 0.5 to 2.5 parts by weight of water per part by weight of the dry filament material, the water being at a temperature of at least 80° C., and the washing being carried out in countercurrent for at least 30 seconds.

4,124,675

PROCESS OF INSERT MOLDING OF TEFLON TUBE AND PLASTIC BODY

Richard H. McFarlane, 2571 Kaneville Rd., Geneva, Ill. 60134

Filed Feb. 10, 1978, Ser. No. 876,926

Int. Cl.[2] B29C *17/02;* B29D *9/00*

U.S. Cl. 264—249 **7 Claims**

1. The process of insert molding a Teflon tube in a plastic body, comprising the steps of:

first, holding a Teflon tube in a fixed axial position at a zone spaced from one end of the tube, the space between said zone and said one end of the tube being of a predetermined axial length having a terminal mouth,

second, positioning a plastic sleeve of predetermined wall thickness closely about said predetermined axial length of said tube, said sleeve being of an axial length less than said predetermined length defining and extending terminal end zone of the Teflon tube.

annular recess symmetrically about said nose with the surface of said nose defining the interior wall of said recess, said annular recess terminating at an edge spaced radially outwardly from said nose a distance greater than the sum of twice the thickness of said tube plus the thickness of said sleeve, said recess being generally semi-circular as seen in an elevation cross sectional view,

fourth, advancing the nose of said heated tool into the mouth of the tube to initiate bending of the mouth and extending terminal end zone of the tube back upon itself with the mouth spaced radially outwardly of the tube,

fifth, continuing to advance the tool and melting the plastic of the sleeve between the turned back portion of the tube and the wall of the tube forming a relatively thick annular ring of plastic between the Teflon of the turned back portion and the tube,

sixth, holding said heated tool in the mouth until the brink end of the mouth portion of the Teflon tube is turned back toward the tube and over the plastic ring at the zone of juncture of the plastic ring and the sleeve to captivate the melted plastic ring of the end of the plastic sleeve between the Teflon,

seventh, removing the nose of the heated tool from the tube,

eighth, releasing the jaws, and

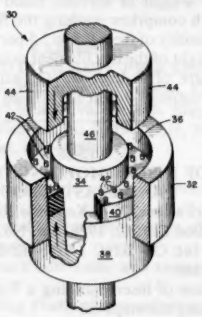
ninth, insert molding and plastic piece about said ring and a portion of said sleeve.

4,124,676

MECHANICAL BOND

Jerry Henzl, Crystal Lake, Ill., assignor to Crane Packing Co., Morton Grove, Ill.

Filed Sep. 29, 1976, Ser. No. 727,676
Int. Cl.[2] B29D *9/00*
U.S. Cl. 264—250 **5 Claims**



1. A method for forming interlocking cavities in a plastic article comprising:

(a) introducing a plastic resin into a mold cavity having resilient projections extending from a surface thereof;

(b) compressing said resin for distorting said resilient projections and for forming cavities in the resin with distorted, irregular wall surfaces within said compressed resin; and

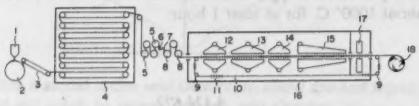
(c) permitting said resin to cure into a solid article.

4,124,677

METHOD OF MANUFACTURING POLYVINYL ALCOHOL FILMS ORIENTED IN TWO ORTHOGONAL DIRECTIONS

Hiromu Saijó, Sunto; Shigeru Miyazaki, Numazu; Koichi Kanazawa, Numazu; Nobuhide Tomura, Numazu, and Toshihiro Ozawa, Fuji, all of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 6, 1976, Ser. No. 747,785
Claims priority, application Japan, Dec. 9, 1975, 50-145910
Int. Cl.[2] B29C *17/02*
U.S. Cl. 264—289 **6 Claims**



1. In a method of manufacturing a polyvinyl alcohol film successively oriented in two orthogonal directions by using a roller type longitudinal elongation machine and a clip type lateral elongation machine, the improvement which comprises the steps of longitudinally elongating a polyvinyl alcohol film by more than 200% while maintaining the initial water content $(Z \times 100)\%$ of the film at a value of from 10 to 35%, where Z represents a value obtained by dividing the weight of the water contained in the film by the weight of the dry film, and $(Z \times 100)\%$ represents a proportion in percent of the weight of the water contained in the film with respect to the weight of the dry film, and maintaining the temperature in the film in a range of from a lower limit of $(1.50/Z + 20)°$ C. to an upper limit of 75° C., preheating the longitudinally elongated film to a temperature lower than the temperature at which the film is elongated laterally while maintaining the water content thereof at at least 7%, elongating laterally the preheated film by more than 200% at a temperature of from 45° to 110° C. while preventing the film from shrinking longitudinally, drying and heat treating the film at a temperature of 110° to 210° C. while permitting the film to cause it to shrink by less than 15% in the lateral direction, and finally cooling the film to room temperature under tension.

4,124,678

METHOD OF MAKING TORTUOUS TUBULAR ARTICLES

James D. Stroupe, Newton, Pa., assignor to Sipler Plastics, Inc., Doylestown, Pa.

Continuation-in-part of Ser. No. 567,096, Apr. 11, 1975. This application Dec. 29, 1977, Ser. No. 865,494
Int. Cl.[2] B29C *1/12*; B29D *23/00*
U.S. Cl. 264—314 **12 Claims**

1. The method of making a unitary hollow rigid tubular article by air displacement in a mold which comprises:

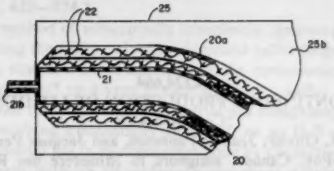
mounting on an expansible and flexible core tube a thermosetting resin containing compressible element in at least partial covering relation to the core tube;

mounting in covering relation to said element and in surrounding relation to the core tube an elongated circumferentially expansible seamless knitted fabric tube of a continuous length corresponding to a desired length of the finished article;

applying locally in at least partial covering relation to said fabric tube, adjacent abrupt changes in tube configuration,

a porous, compressible member to control flow of resin and air;

inserting the expansible tube with assembled layers into an elongated smooth cavity in a mold which cavity has a fixed torous non-planar longitudinal configuration and a variable cross sectional area along the length thereof and is shaped to conform to a desired exterior shape of the finished article,



expanding the core tube to compress resin from the resin containing element and expanding and distorting the fabric tube thereon to conform to the elongated mold cavity by pressure applied by the core tube and by the expansion forcing displacement of air and distribution of the resin into the interstices of the fabric tube and the compressible member,

curing the resin by heat in the mold,

removing the formed assembly from the mold, and

removing the core tube.

4,124,679

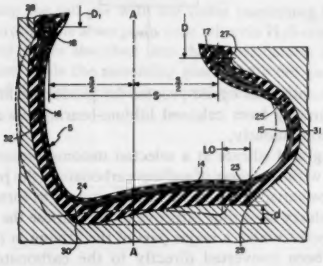
METHOD OF BUILDING A TIRE WITH UNEQUAL BEAD DIAMETERS

Marion A. DeWitt, North Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 28, 1974, Ser. No. 473,647

Int. Cl.[2] B29H *5/02*

U.S. Cl. 264—326 **6 Claims**



1. A method of molding and vulcanizing a tire with unequal bead diameters and equal contour lengths, comprising:

(a) moving the beads adjacent opposing mold contours where the beads are spaced different distances from the center axis of the mold and equally spaced from a mold plane which is normal to the center axis of the mold;

(b) expanding unvulcanized rubbery material of the tire against an annular mold contour in radially spaced relation from the opposing mold contours, to form an outer peripheral tread surface which, in the mold, is angularly disposed to the mold plane and unsymmetrical in relation thereto;

(c) expanding other unvulcanized rubbery material of the tire against opposing, curved mold contours between the annular mold contour forming the tread surface and each of the mold contours adjacent the beads, for forming outer surfaces of the sidewalls of the tire; and

(d) heating the unvulcanized rubbery material expanded against the mold contours, to vulcanize said material, thereby forming a tire.

4,124,680

METHOD OF OBTAINING PURE ALUMINA BY ACID ATTACK ON ALUMINOUS MINERALS CONTAINING OTHER ELEMENTS

Joseph Cohen, and Alain Adjemian, both of Aix en Provence, France, assignors to Aluminum Pechiney, Gardanne, France

Filed Feb. 9, 1978, Ser. No. 876,206

Claims priority, application France, Feb. 28, 1977, 77 06530

Int. Cl.[2] C01F *7/22, 7/26*

U.S. Cl. 423—126 **14 Claims**

1. A method of obtaining alumina of high purity from aluminous mineral containing impurities in which the mineral is attacked with a sulphuric acid liquor followed by separation of a liquid phase from the resulting solid residue comprising

(1) mixing the liquid phase with a liquor containing HCl and H_2SO_4 at elevated temperature,

(2) cooling the mixture with the precipitation of hydrated aluminum chlorosulphate having the formula $AlSO_4Cl.6\text{–}7H_2O$,

(3) separating the precipitate from the remaining liquor which contains the major part of the impurities in solution,

(4) suspending the separated precipitate in a hydrochloric acid liquor,

(5) chlorinating the suspension by introduction of gaseous HCl with precipitation of $AlCl_3.6H_2O$,

(6) separating the precipitated $AlCl_3.6H_2O$, and

(7) pyrolizing the separated precipitate to produce alumina of high purity and gaseous HCl.

4,124,681

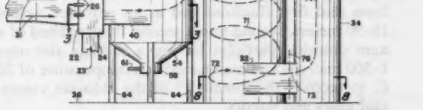
PARTICULATE CARBON DISPOSAL BY COMBUSTION

Robert D. Reed; Wallace F. Hart, and John M. Cegielski, all of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Aug. 15, 1977, Ser. No. 824,292

Int. Cl.[2] F23B *5/02*

U.S. Cl. 423—210 **8 Claims**



6. The method of burning hot gaseous and particulate products from a kiln, in which carbon is being calcined, said hot gaseous and particulate products passing into a refractory lined inlet conduit, comprising;

(a) injecting air under pressure into said inlet conduit;

(b) injecting sprays of water droplets with said air into said inlet conduit; where said air and water mix with said hot gaseous and particulate products, which burn;

(c) discharging said burning hot products tangentially into at least a first vertical cylindrical vessel at the bottom end;

(d) passing said burning hot products along a helical path upwardly in said vessel, whereby said particulate matter will be thrown outwardly against the wall of said vessel, and will fall to the bottom;

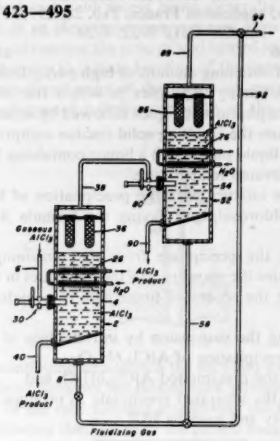
(e) collecting the particulate matter at the bottom of said vessel; and

(f) discharging the burned hot gases from the top of said at least one vessel.

4,124,682
METHOD OF PRODUCING HIGH PURITY ALUMINUM CHLORIDE

Stanley C. Jacobs, Lower Burrell, Pa., and Larry K. King, Maryville, Tenn., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 765,459, Feb. 3, 1977, Pat. No. 4,070,448. This application Jan. 6, 1978, Ser. No. 867,585
The portion of the term of this patent subsequent to Jan. 24, 1995, has been disclaimed.
Int. Cl.[2] C01F 7/58
U.S. Cl. 423—495 3 Claims



1. In the process for the recovery of high purity particulate aluminum chloride from a chlorinator by the condensation of hot aluminum chloride vapors the improvement which comprises:

(a) introducing the aluminum chloride vapors at an entrance velocity of 18 to 90 meters/second into a first fluidized bed having a particle size range of 1–500 microns of aluminum chloride particles maintained at a temperature of 80°–110° C.;

(b) controlling the size of the solid particles of aluminum chloride particles within the fluidized bed during condensation to prevent growth of the particles larger than 500 microns;

(c) passing the remaining uncondensed gases and vapors from said first fluidized bed at an entrance velocity of 18–90 meters/second into a second fluidized bed of aluminum chloride particles having a particle size range of 1–500 microns and maintained at a temperature of 20°–50° C. to recover the remainder of the chloride values from said gases and vapors.

4,124,683
RECOVERY OF MAGNESIUM FROM MAGNESIUM SILICATES

Jean-Marc Lalancette, Sherbrooke, Canada, assignor to Universite de Sherbrooke, Quebec, Canada

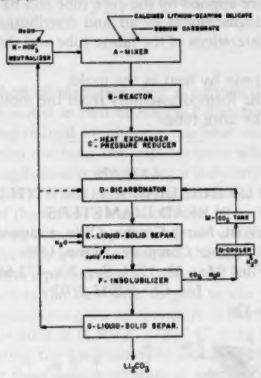
Filed Sep. 30, 1977, Ser. No. 838,220
Int. Cl.[2] C01F 5/40
U.S. Cl. 423—166 4 Claims

1. In a process for the extraction of a magnesium compound from a naturally-occurring mineral containing at least 10% magnesium silicate, the improvement which comprises digesting an aqueous suspension of a naturally-occurring mineral containing at least 10% magnesium silicate with sulfur dioxide and recovering the crude solution of magnesium bisulfite thus obtained, and adjusting the pH of said magnesium bisulfite solution under an oxidizing atmosphere with ammonium hydroxide or an alkali metal hydroxide to a pH between 8 and 8.9 thereby to precipitate the impurities contained in the starting mineral and to obtain a substantially pure magnesium sulfate-containing solution, and recovering the magnesium-sulfate-containing-solution.

4,124,684
CONTINUOUS PRODUCTION OF LITHIUM CARBONATE

Charles A. Olivier; Jean J. Panneton, and Jacques Perusse, all of Ste-Foy, Canada, assignors to Ministere des Richesses Naturelles, Gouvernement du Quebec, Quebec, Canada

Filed Aug. 9, 1977, Ser. No. 823,143
Claims priority, application United Kingdom, Aug. 10, 1976, 33273/76
Int. Cl.[2] C01D 7/00
U.S. Cl. 423—179.5 15 Claims


A - MIXER
B - REACTOR
C - HEAT EXCHANGER
C - PRESSURE REDUCER
D - BICARBONATOR
E - LIQUID - SOLID SEPAR.
F - INSOLUBILIZER
G - LIQUID - SOLID SEPAR.

15. A continuous cyclic process for producing lithium carbonate directly from calcined lithium-bearing silicates, comprising, continuously,

reacting said silicate at a selected decomposition temperature with an excess of sodium carbonate in the presence of a substantial minimum of water required to form an aqueous slurry for a time effective to decompose the silicate to the point where a major part of the lithium in the silicate has been converted directly to the carbonate, thereby providing a mixture containing solid lithium carbonate and sodium aluminosilicate,

without increasing its liquid content cooling the mixture and leaching it with carbon dioxide at a pressure at at least atmospheric to provide a solid residue and a lithium bicarbonate-lithium solution,

separating the lithium bicarbonate-bearing solution from the solid residue,

heating and agitating said lithium bicarbonate-bearing solution to drive off carbon dioxide gas and to provide a precipitate of solid crystalline lithium carbonate and mother liquor containing traces of lithium, unreacted sodium and bicarbonate ions,

separating the mother liquor from the lithium carbonate and neutralizing it to reduce the bicarbonate ions substantially to a minimum,

returning the neutralized mother liquor to the decomposing step,

and recovering the lithium carbonate.

4,124,685
METHOD FOR SUBSTANTIALLY COMPLETE REMOVAL OF HYDROGEN SULFIDE FROM SULFUR BEARING INDUSTRIAL GASES

Mehmet O. Tarhan, 722 Beverly Ave., Bethlehem, Pa. 18018, and Daniel Kwasnoski, 103 Beech Cir., Hellertown, Pa. 18055

Continuation-in-part of Ser. No. 693,991, Jun. 8, 1976, abandoned. This application Jan. 30, 1978, Ser. No. 873,464

Int. Cl.[2] C01B *17/00*

U.S. Cl. 423—574 L **15 Claims**

1. A method of substantially completely removing H_2S and recovering the sulfur values as elemental sulfur from an industrial gas stream without exhaust into the environment of a tail gas, a bleed-off or a vent stream containing sulfur pollutants other than the desulfurized industrial gas comprising:

(a) absorbing substantially all H_2S from an H_2S containing industrial gas in an absorption zone by contacting said gas stream with an alkanolamine absorbent solution in said absorption zone at a rate such that not more than 3 moles of CO_2 per mole of absorbed H_2S is absorbed from the gas stream to form an H_2S-rich absorbent solution and a substantially desulfurized industrial gas,

(b) stripping the H_2S-rich absorbent solution to recover the H_2S,

(c) combining the recovered H_2S with SO_2 in a ratio of H_2S to SO_2 from 2.1:1 to 2.5-1 in a low temperature reaction zone operated at a temperature not greater than 160° C. within a liquid-phase reaction medium to form elemental sulfur and H_2O with an excess of unreacted H_2S remaining sufficient to ensure that there is essentially complete reaction of all SO_2 in said reaction zone with H_2S,

(d) removing sulfur from the liquid phase reaction medium in the low temperature reaction zone in the form of elemental sulfur and excess unreacted H_2S contained in a tail gas from said reaction zone,

(e) recycling the tail gas containing the excess H_2S from the liquid phase reaction medium in the low temperature reaction zone of step (c) to the absorption zone of step (a), and

(f) passing the tail gas with the sulfur containing industrial gas through the absorption zone wherein H_2S contained in the tail gas is absorbed into the alkanolamine absorbent solution while the remaining gases of the tail gas become part of the desulfurized industrial gas.

4,124,686
CRYSTALLINE ZEOLITE PHI

Robert W. Grose, Mobile, Ala., and Edith M. Flanigen, White Plains, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 456,803, Apr. 1, 1974, abandoned. This application Nov. 21, 1977, Ser. No. 853,762

Int. Cl.[2] C01B *33/28;* **C07F** *5/06*

U.S. Cl. 423—328 **2 Claims**

1. A synthetic crystalline zeolitic molecular sieve having a composition expressed in terms of moles of oxides as follows:

$$0.97\text{–}1.10\ M_2O/n : Al_2O_3 : 4\text{–}7\ SiO_2 : 0\text{–}6.0\ H_2O,$$

wherein "M" is at least one or a mixture of two or more of hydrogen, alkylammonium, ammonium or metal cations having a valence of "n," said zeolitic molecular sieve having an X-ray powder diffraction pattern containing at least those d-spacings set forth in Table B.

4,124,687
PROCESS FOR THE OXIDATION OF AMMONIA TO NITROUS OXIDE

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 712,002, Aug. 5, 1976, Pat. No. 4,082,837, which is a division of Ser. No. 556,670, Mar. 10, 1975, Pat. No. 3,976,559, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,855,020. This application Dec. 8, 1977, Ser. No. 858,560

Int. Cl.[2] C01B *21/22;* **B01D** *53/34*

U.S. Cl. 423—404 **1 Claim**

1. A process for the selective oxidation of ammonia to nitrous oxide in the presence of elemental nitrogen with minimal oxidation thereof, which comprises combining the ammonia with a predetermined amount of oxygen containing gas to give at least a 1% stoichiometric excess of oxygen for the oxidation of the ammonia to nitrous oxide, and passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 100° C. and about 400° C.:

$$W_kX_mJ_{(1-k-n)}ZO_{(3\pm m)}$$

wherein

W is Zirconium, Tin or Thorium or mixtures thereof;

X is an alkaline earth metal or mixture thereof;

J is scandium yttrium a rare-earth element or mixture thereof;

Z is a metal of the first transition series or a mixture thereof, at least 0.01% of said metal having an oxidation state other than +3;

k is a number having a value between 0 and about 0.1;

m is a number having a value of from 0 to about 0.26; and

n is a number having a value from 0 to about 0.51, provided when n has a value of 0, k has a value between 0 and 0.05.

4,124,688
PROCESS FOR PREPARING CUBIC CRYSTALS OF CALCIUM CARBONATE

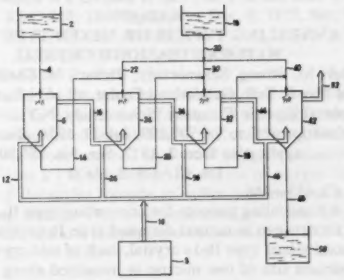
Hiroji Shibazaki, Takarazuka; Setsuji Edagawa, Nishinomiya; Hisashi Hasegawa, Nishinomiya, and Satoshi Kondo, Nishinomiya, all of Japan, assignors to Shiraishi Kogyo Kaisha, Ltd., Amagasaki, Japan

Filed Aug. 24, 1977, Ser. No. 827,218

Claims priority, application Japan, Oct. 1, 1976, 51-118810

Int. Cl.[2] C01F *11/18*

U.S. Cl. 423—432 **15 Claims**



1. A process for preparing cubic calcium carbonate crystals of uniform size in the range of about 0.1 to about 1.0 microns which comprises:

(i) a first step of spraying a starting aqueous suspension containing calcium hydroxide and cubic calcium carbonate crystals less than 0.1 microns in average size into a carbon dioxide-containing gas ascending at a superficial velocity of about 0.1 to 3.0 m/sec in the form of droplets 0.2 to 2.0 microns in diameter, the suspension having a

solids concentration of up to 15% by weight and the ratio of calcium carbonate to calcium hydroxide in the suspension being 100:1 to 30 by weight, and

(ii) a second step of adding calcium hydroxide to the aqueous suspension resulting from the first step and spraying the mixture into a carbon dioxide-containing gas ascending at a superficial velocity of about 0.1 to 3.0 m/sec in the form of droplets 0.2 to 2.0 microns in diameter, the mixture having a solids concentration of up to 15% by weight and the ratio of calcium carbonate to calcium hydroxide in the mixture being 100:1 to 30 by weight.

4,124,689

PROCESS FOR THE OXIDATION OF CARBON MONOXIDE TO CARBON DIOXIDE

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 712,002, Aug. 5, 1976, Pat. No. 4,082,837, which is a division of Ser. No. 556,670, Mar. 10, 1975, Pat. No. 3,976,559, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,855,020. This application Dec. 8, 1977, Ser. No. 858,555

Int. Cl.[2] C01B *31/20;* **B01D** *53/34*

U.S. Cl. 423—437 **1 Claim**

1. A process for the selective oxidation of carbon monoxide to carbon dioxide in the presence of elemental nitrogen with minimal oxidation thereof, which comprises combining the carbon monoxide with a predetermined amount of oxygen containing gas to give at least a 1% stoichiometric excess of oxygen for the oxidation of the carbon monoxide to carbon dioxide; and passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 100° C. and about 1,000° C.:

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m)}$$

wherein

W is Zirconium, Tin or Thorium or mixtures thereof;

X is an alkaline earth metal or mixture thereof;

J is scandium yttrium a rare-earth element or mixture thereof;

Z is a metal of the first transition series or a mixture thereof, at least 0.01% of said metal having an oxidation state other than +3;

k is a number having a value between 0 and about 0.1;

m is a number having a value of from 0 to about 0.26; and

n is a number having a value from 0 to about 0.51, provided when n has a value of 0, k has a value between 0 and 0.05.

4,124,690

ANNEALING TYPE IB OR MIXED TYPE IB-IA NATURAL DIAMOND CRYSTAL

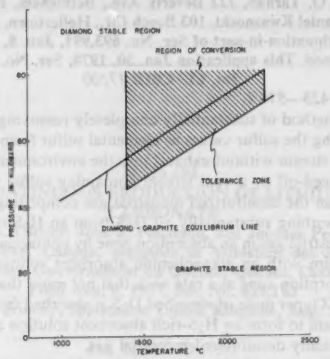
Herbert M. Strong, Schenectady; Richard M. Chrenko, Scotia, and Roy E. Tuft, Guilderland Center, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 707,299, Jul. 21, 1976, abandoned. This application Dec. 2, 1977, Ser. No. 856,905

Int. Cl.[2] C01B *31/06*

U.S. Cl. 423—446 **3 Claims**

1. An annealing process for converting type Ib nitrogen to type Ia nitrogen in natural diamond type Ib crystal or natural diamond mixed type Ib-Ia crystal, each of said crystals having a minimum size of one micron as measured along the longest edge dimension of the crystal, which consists essentially of subjecting a specimen consisting of said crystal to an annealing temperature ranging from about 1500° C. to about 2200° C. under at least a pressure which prevents significant graphitization of said crystal at said annealing temperature for a period of time ranging from about one minute to about 50 hours and sufficient to convert at least about 20% of the total amount of type Ib nitrogen present in said crystal to type Ia nitrogen, the minimum pressure ranging from 48 kilobars at said annealing temperature of 1500° C. to a minimum pressure of 70 kilobars at said annealing temperature of 2200° C., and recovering the resulting annealed free diamond crystal wherein the dissolved nitrogen detectable by ultraviolet, visible and infrared absorption spectra and electron paramagnetic resonance consists of



types Ib and Ia nitrogen, said type Ib nitrogen always being present in said annealed crystal in at least a detectable amount, said annealing process making no significant change in the physical dimensions of said diamond crystal.

4,124,691

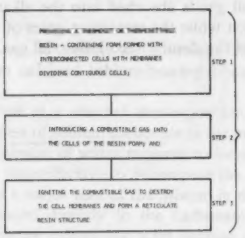
METHOD FOR THE PREPARATION OF RETICULATE CARBON STRUCTURES

Henry C. Geen, Brooklyn; Clarence S. Vinton, and Christopher J. Torbet, both of Ann Arbor, all of Mich., assignors to Chemotronics International, Inc., Ann Arbor, Mich.

Filed Mar. 30, 1977, Ser. No. 782,624

Int. Cl.[2] C01B *31/02*

U.S. Cl. 423—449 **12 Claims**


PROVIDING A THERMOSET OR THERMOSETTABLE RESIN - CONTAINING FOAM FORMED WITH INTERCONNECTED CELLS WITH MEMBRANES DIVIDING CONTIGUOUS CELLS;
STEP 1
INTRODUCING A COMBUSTIBLE GAS INTO THE CELLS OF THE RESIN FOAM; AND
STEP 2
IGNITING THE COMBUSTIBLE GAS TO DESTROY THE CELL MEMBRANES AND FORM A RETICULATE RESIN STRUCTURE
STEP 3

1. The process for producing a reticulate carbon structure which comprises:

(a) providing a thermoset or thermosettable resin containing polyisocyanate derived foam formed of interconnected cells with membranes dividing contiguous cells wherein the membranes are substantially thinner in cross-section than strands formed where the membranes intersect and wherein the cells are interconnected by openings in the membranes so as to allow a combustible gas to fill the cells and thus surround the membranes and which foam is carbonizable to a carbon structure;

(b) introducing a combustible gas into the cells of the resin containing foam;

(c) igniting the combustible gas to destroy the cell membranes and form a reticulate resin structure which is carbonizable; and

(d) carbonizing the reticulate resin structure.

4,124,692
PREPARATION OF ANHYDROUS TaF_5

Chang J. Kim, Somerset, and Dan Farcasiu, Princeton, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

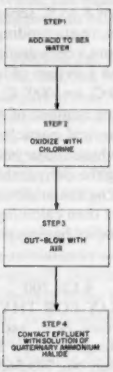
Filed Dec. 27, 1977, Ser. No. 864,687
Int. Cl.[2] C01G *35/00*
U.S. Cl. 423—492 **14 Claims**

1. A process for the preparation of anhydrous TaF_5 which comprises contacting a mixture comprising water and fluorotantalic acids with a dehydrating agent containing at least two carbon-chlorine bonds, at least two carbon-bromine bonds or mixtures thereof for a period of time sufficient to convert at least a portion of said mixture to anhydrous TaF_5.

4,124,693
RECOVERY, MANIPULATION AND STORAGE OF BROMINE

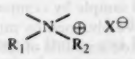
Joseph A. Shropshire, Westfield, and Daniel J. Eustace, Chatham, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Sep. 14, 1977, Ser. No. 833,132
Int. Cl.[2] C01B *7/10*; B01D *53/34*
U.S. Cl. 423—503 **16 Claims**



1. In the process of extracting bromine from a bromine vapor containing fluid stream by contacting said fluid stream is an adsorption stage with an aqueous ammonium salt containing solution to form polybromides in said solution, the improvement comprising:

contacting said bromine containing fluid stream which an aqueous solution of a quaternary ammonium salt selected from asymmetric quaternary ammonium compounds having the formula



wherein the dangling valence of nitrogen indicates that nitrogen is an endocyclic nitrogen atom connected to carbon atoms, and in which said nitrogen atom and said carbon atoms form a ring structure selected from a saturated five-member ring structure and a saturated six-member ring structure including an additional heteroatom and where X^- is a halide selected from chloride and bromide, R_1 is selected from an alkyl group and haloalkyl group of from 1 to 8 carbon atoms and R_2 is selected from alkyl groups or haloalkyl groups of from 1 to 8 carbon atoms but different from R_1, and which asymmetric quaternary ammonium compound is capable of combining with molecular bromine to form a polybromide which is a substantially water immiscible liquid at temperatures in the range of about 10° C. to about 60° C., whereby bromine is extracted from said bromine containing fluid stream in the form of a water immiscible bromine containing oil.

4,124,694
PROCESS FOR THE OXIDATION OF HYDROGEN SULFIDE TO SULFUR TRIOXIDE

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 712,002, Aug. 5, 1976, Pat. No. 4,082,837, which is a division of Ser. No. 556,670, Mar. 10, 1975, Pat. No. 3,976,559, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,855,020. This application Dec. 8, 1977, Ser. No. 858,558
Int. Cl.[2] C01B *17/68*; B01D *53/34*
U.S. Cl. 423—538 **1 Claim**

1. A process for the selective oxidation of hydrogen sulfide to sulfur thioxide in the presence of elemental nitrogen with minimal oxidation thereof, which comprises combining the hydrogen sulfide with a predetermined amount of oxygen containing gas to give at least a 1% stoichiometric excess of oxygen for the oxidation of the hydrogen sulfide to sulfur trioxide; and passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 100° C. and about 700° C.:

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m)}$$

wherein

W is Zirconium, Tin or Thorium or mixtures thereof;
X is an alkaline earth metal or mixture thereof;
J is scandium yttrium a rare-earth element or mixture thereof;
Z is a metal of the first transition series or a mixture thereof, at least 0.01% of said metal having an oxidation state other than +3;
k is a number having a value between 0 and about 0.1;
m is a number having a value of from 0 to about 0.26; and
n is a number having a value from 0 to about 0.51, provided when n has a value of 0, k has a value between 0 and 0.05.

4,124,695
PROCESS FOR THE OXIDATION OF SULFUR DIOXIDE TO SULFUR TRIOXIDE

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 712,002, Aug. 5, 1976, Pat. No. 4,082,837, which is a division of Ser. No. 556,670, Mar. 10, 1975, Pat. No. 3,976,559, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,855,020. This application Dec. 8, 1977, Ser. No. 858,557
Int. Cl.[2] C01B *17/68*; B01D *53/34*
U.S. Cl. 423—538 **1 Claim**

1. A process for the selective oxidation of sulfur dioxide to sulfur trioxide in the presence of elemental nitrogen with minimal oxidation thereof, which comprises combining the sulfur dioxide with a predetermined amount of oxygen containing gas to give at least a 1% stoichiometric excess of oxygen for the oxidation of the sulfur dioxide to sulfur trioxide; and passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 120° C. and about 800° C.:

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m)}$$

wherein

W is Zirconium, Tin or Thorium or mixtures thereof;
X is an alkaline earth metal or mixture thereof;
J is scandium yttrium a rare-earth element or mixture thereof;
Z is a metal of the first transition series or a mixture thereof, at least 0.01% of said metal having an oxidation state other than +3;

k is a number having a value between 0 and about 0.1;
m is a number having a value of from 0 to about 0.26; and
n is a number having a value from 0 to about 0.51, provided when *n* has a value of 0, *k* has a value between 0 and 0.05.

4,124,696

METHOD FOR SEALING LEAKAGE ACROSS VALVES IN A SULFUR RECOVERY PLANT

Lorenz V. Kunkel, Naperville, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 7, 1977, Ser. No. 848,974
Int. Cl.[2] C01B *17/04*
U.S. Cl. 423—574 R **3 Claims**

1. In a process for the catalytic conversion of gaseous feed mixture containing hydrogen sulfide and sulfur dioxide to sulfur for the purpose of removing said sulfur wherein a valve is being employed which is subject to leakage when said valve is closed, thus reducing the efficiency of the sulfur removal, the specific improvement comprising; recycling a portion of an indigenous tail gas stream substantially free of sulfur and sulfur compounds to the high pressure side of said closed valve and injecting said recycled tail gas to said high pressure side of said valve at a rate equal to or slightly higher than the rate of leakage across said closed valve, thus reducing the amount of sulfur and sulfur compounds leaking past said valve.

4,124,697

PROCESS FOR THE OXIDATION OF HYDROGEN TO WATER

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 712,002, Aug. 5, 1976, Pat. No. 4,082,837, which is a division of Ser. No. 556,670, Mar. 10, 1075, Pat. No. 3,976,599, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,855,020. This application Dec. 8, 1977, Ser. No. 858,556
Int. Cl.[2] C01B *5/00;* B01D *53/34*
U.S. Cl. 423—580 **1 Claim**

1. A process for the selective oxidation of hydrogen to water in the presence of elemental nitrogen with minimal oxidation thereof, which comprises combining the hydrogen with a predetermined amount of oxygen containing gas to give at least a 1% stoichiometric excess of oxygen for the oxidation of the hydrogen to water; and passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 100° C. and about 1,000° C.:

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m)}$$

wherein
W is Zirconium, Tin or Thorium or mixtures thereof;
X is an alkaline earth metal or mixture thereof;
J is scandium yttrium a rare-earth element or mixture thereof;
Z is a metal of the first transition series or a mixture thereof, at least 0.01% of said metal having an oxidation state other than +3;
k is a number having a value between 0 and about 0.1;
m is a number having a value of from 0 to about 0.26; and
n is a number having a value from 0 to about 0.51, provided when *n* has a value of 0, *k* has a value between 0 and 0.05.

4,124,698

METHOD OF CHEMICALLY SHARPENING MONOCRYSTALLINE RIBBON

Naim Hemmat, Mendham, N.J.; Harold E. Labelle, Jr., Hanover, and Charles Lamport, Tewksbury, both of Mass., assignors to Tyco Laboratories, Inc., Exeter, N.H.

Continuation of Ser. No. 553,113, Feb. 26, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,186
Int. Cl.[2] C01F *7/02;* C23F *1/02*
U.S. Cl. 156—637 **7 Claims**

1. A method of sharpening opposed edges on an elongate substantially monocrystalline alumina ribbonlike body comprising suspending said body in a solvent for said alumina, and establishing and maintaining relative movement between said body and said solvent with the direction of relative movement being generally normal to the plane of said body, said movement being controlled so as to substantially avoid turbulence within said solvent, and periodically reversing the direction of said relative movement while maintaining said body suspended in said solvent so as to subst..ntially equally sharpen said opposed edges.

4,124,699

ALUMINA-BASED BODIES WITH LARGE PORES, PRODUCED BY AGGLOMERATION

Max Michel, Yerres, and Jean-Paul Fort, Antony, both of France, assignors to Rhone Progil, Courbevoie, France

Continuation of Ser. No. 708,229, Jul. 23, 1976, abandoned, which is a continuation of Ser. No. 451,237, Mar. 14, 1974, abandoned. This application Mar. 17, 1978, Ser. No. 887,543
Claims priority, application France, Mar. 14, 1973, 73.09088
Int. Cl.[2] C01F *7/02*
U.S. Cl. 423—628 **5 Claims**

1. The method of producing high strength bodies of alumina having pores of large dimension comprising precipitating an amorphous alumina gel from an aluminate solution with acid at a pH within the range of 8 to 9, separating and washing the precipitated gel particles, re-suspending the separated gel particles in aqueous medium, dehydrating the amorphous gel particles by spraying into a stream of hot gas at a temperature within the range of 350° C. to 1000° C. rapidily to remove the water to a residual water content of 8 to 35% by weight to yield highly porous spherical particles having a diameter of less than 100 μ and in which the crystalline phases are highly disorganized, moistening the dehydrated gel particles in acidic solution and agglomerating the moistened particles, drying the formed agglomerate, and then calcining the dried agglomerate to form agglomerated bodies having pores of large dimension.

4,124,700

IMMUNOASSAY FOR THYMOPOIETIN

Gideon Goldstein, Riverdale, N.Y., assignor to Sloan Kettering Institute for Cancer Research, New York, N.Y.

Continuation-in-part of Ser. No. 709,565, Jul. 28, 1976, Pat. No. 4,055,633. This application Jun. 27, 1977, Ser. No. 810,269
Int. Cl.[2] G01N *33/16;* A61K *43/00*
U.S. Cl. 424—1 **10 Claims**

10. A method for the radioimmunoassay of thymopoietin in a serum sample, which method comprises mixing said sample with a known amount of radiolabeled thymopoietin and an antibody which will selectively complex with said thymopoietin, separating the resulting antibody-antigen complex from the supernatant, measuring the degree of binding of said radiolabeled thymopoietin in said complex and determining the amount of thymopoientin present in said sample by comparing said degree of binding to a standard curve obtained by mixing known amounts of thymopoietin with fixed amounts of labeled thymopoietin and said antibody, and determining the degree of binding for each known amount of thymopoietin.

4,124,701

METHOD FOR PREPARING A REAGENT FOR PLT AND METHOD OF USE

Marilyn L. Bach, and Fritz H. Bach, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation of Ser. No. 697,029, Jun. 17, 1976, abandoned. This application Jul. 11, 1977, Ser. No. 814,316
Int. Cl.[2] G01N *31/00, 33/16;* C12K *9/00*
U.S. Cl. 424—12 **9 Claims**

1. A method for preparation of a reagent for lymphocyte-defined typing of human leukocyte antigens which comprises

incubating in vitro purified blood leukocytes with human cells selected from lymphoblastoid cell lines from homozygous typing cells, other cells homozygous for HLA-D, or other continuous line cells, and recovering the leukocytes from the incubation medium.

6. A reagent for lymphocyte defined typing of human leukocyte antigens produced by the method of claim 1.

9. A method for typing human leukocyte antigens comprising incubating in vitro the reagent of claim 6 with purified human block leukocytes obtained from a third person, measuring the response of the recovered leukocytes through the uptake by the responding leukocytes of tritiated thymidine or tritiated uridine added to the incubating mixture, said measurement defining the antigens present in the third person.

4,124,702

POLYNUCLEOTIDES ACTIVE AS INDUCERS OF INTERFERON PRODUCTION IN LIVING ANIMAL CELLS

George P. Lampson, Hatfield; Alfred A. Tytell, Lansdale; Arthur K. Field, North Wales, and Maurice R. Hilleman, Lafayette Hill, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 160,188, Jul. 6, 1971, abandoned, which is a continuation of Ser. No. 684,936, Nov. 22, 1967, abandoned, which is a continuation-in-part of Ser. No. 659,308, Oct. 9, 1967, abandoned, which is a continuation-in-part of Ser. No. 641,119, May 25, 1967, abandoned, which is a continuation-in-part of Ser. No. 604,137, Dec. 23, 1966, abandoned. This application Dec. 14, 1976, Ser. No. 750,499

Int. Cl.[2] A61K *45/04*

U.S. Cl. 424—85 **3 Claims**

1. The method of stimulating the production of species-specific interferon in living animal cells which involves subjecting said cells to the species-specific interferon inducing effect of a doublestranded polynucleotide in the substantial absence of an inhibiting factor wherein said doublestranded polynucleotide is a synthetic chemically defined non-toxic, non-antigenic, non-replicating polymer resulting from the complexing of 1:1 molar ratios, with respect to their bases, of polyinosinic acid and polycytidylic acid, which themselves are synthetic, and each lacking the capacity to induce the production of species-specific interferon.

4,124,703

LULIBERIN ANALOGS

Anand S. Dutta, and Michael B. Giles, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 26, 1977, Ser. No. 800,853

Claims priority, application United Kingdom, Oct. 12, 1976, 42318/76

Int. Cl.[2] A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **3 Claims**

1. A polypeptide of the formula:

I

Glu-D-Phe-Trp-Ser-Tyr-D-Phe-Leu-Arg-Pro-Azgly-NH_2

and the pharmaceutically- and veterinarily-acceptable acid-addition salts thereof.

4,124,704

2-NITRO-3-PHENYLBENZOFURAN ALKANOIC (OR PROPENOIC) ACIDS

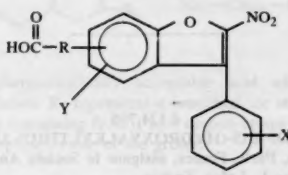
Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Continuation-in-part of Ser. No. 724,717, Sep. 20, 1976, abandoned, which is a continuation-in-part of Ser. No. 616,277, Sep. 24, 1975, abandoned. This application Jun. 14, 1977, Ser. No. 806,526

Int. Cl.[2] C07D *307/82*

U.S. Cl. 424—180 **40 Claims**

1. A compound of the formula



wherein X is halogen, lower alkyl, lower alkoxy, nitro, phenyl, cyano or trifluoromethyl, *n* is zero, one or two, R is straight or branched chain alkylene of one to four carbon atoms or ethenylene, Y is methyl, methoxy, halogen or hydrogen or an ester, amide, acyl halide or pharmaceutically acceptable salt thereof, the ester and amide portions of those derivatives containing not more than ten carbon atoms said ester being selected from the group consisting of lower alkyl esters, hydroxyalkyl esters, N,N-dialkylaminoalkyl esters, glyceryl esters and alkoxyalkyl esters and said amides being selected from the group consisting of N-unsubstituted amides, N-alkylamides, N-N-dialkylamides, dialkylaminoalkylamides, quaternary ammonium alkylamides, bis(2-hydroxyethyl) amides, amino acid amides, carboxyphenylamides, piperazinyl amides amino sugar amides, alkylsulfonamides, sulfoethylamides, sulfamoylphenylamides, and 5-tetrazolylamides.

40. An antimicrobial composition comprising an antimicrobially effective amount of a compound according to claim 1 dispersed in a pharmaceutically acceptable extending medium.

4,124,705

AGENT FOR INTRAVASCULAR ADMINISTRATION

Ulf S. E. Rothman, Höllviksnäs, and Bernt J. Lindberg, Upsala, both of Sweden, assignors to Pharmacia Aktiebolag, Upsala, Sweden

Filed Jun. 2, 1975, Ser. No. 583,217

Claims priority, application Sweden, Jun. 6, 1974, 7407462

Int. Cl.[2] A61K *31/715, 29/02*

U.S. Cl. 424—180 **29 Claims**

1. In the known method of effecting a diagnosis by the intravascular administration of a solution or a suspension of a diagnostic agent in an amount effective for said diagnosis, said diagnostic agent being selected from the group consisting of X-ray contrast agents for intravascular use and radioactive diagnostic agents for intravascular administration in a blood vessel located in or leading to a restricted portion of the body, in which method in conjunction with said administration there is also administered intravascularly an agent which comprises minute particles suspended in a physiologically acceptable aqueous liquid, said particles in water-swollen state having a size such that subsequent to being intravascularly administered they block the finer blood vessels located in or leading to the said body portion, and said minute particles being administered in an amount effective for blocking said blood vessels, said diagnosis being effected with the aid of the diagnostic agent, the improvement which comprises using as said minute particles a three-dimensional, water-insoluble, hydrophilic, swellable, cross-linked network of polysaccharide substances, said network being composed of

a polysaccharide substance selected from the group consisting of starch, amylose, amylopectin, glycogen and dextrins thereof,

cross-linking having been effected by ether bonds that form bridges between polysaccharide substances, said bridges being straight or branched aliphatic saturated hydrocarbon chains substituted with one to six hydroxyl groups and containing 3–20 carbon atoms and being unbroken or broken with one to six oxygen atoms,

said three-dimensional network being degradable by the α-amylase in blood plasma into water-soluble fragments.

4,124,706

ESTERS OF BIS-(HYDROXYALKYLTHIO)-ALKANES

Louis Lafon, Paris, France, assignor to Societe Anonyme dite: Laboratoire L. Lafon, France

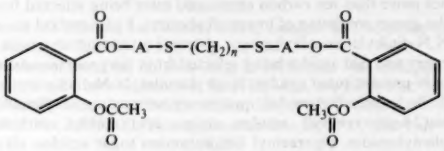
Filed Mar. 30, 1977, Ser. No. 782,918

Claims priority, application United Kingdom, Apr. 2, 1976, 13488/76

Int. Cl.[2] **A61K** *31/60;* **C07C** *69/90*

U.S. Cl. 424—230 **18 Claims**

1. A compound of the formula:



wherein

n has a value of from 5 to 15; and

each A is alkylene of 2 to 6 carbon atoms, unsubstituted or substituted with hydroxy.

15. A pharmaceutical composition comprising an amount of a compound according to claim **1** sufficient to effect a hypolipidemic and hypocholesterolemic response in a patient, said compound being in combination with a pharmaceutically acceptable carrier.

17. The method of effecting a hypolipidemic and hypocholesterolemic response in a patient which comprises administering thereto an effective amount of a compound according to claim **1**.

4,124,707

7α-HALOGENO-3,20-DIOXO-1,4-PREGNADIENES, METHODS FOR THEIR MANUFACTURE, THEIR USE AS ANTI-INFLAMMATORY AGENTS, AND PHARMACEUTICAL FORMULATIONS USEFUL THEREFOR

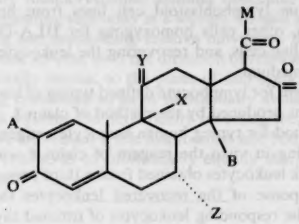
Michael J. Green, Kendall Park, and Ho-Jane Shue, Belleville, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 753,256, Dec. 12, 1976, abandoned. This application Nov. 7, 1977, Ser. No. 848,856

Int. Cl.[2] **C07J** *5/00;* **A61K** *31/58*

U.S. Cl. 424—241 **29 Claims**

1. A 3,20-dioxo-7-halogeno-1,4-pregnadiene of the following formula:



wherein A is hydrogen, and provided Y is (H,βOH), chlorine, fluorine or methyl;

B is hydrogen or, together with Q, is a 14α,17α-alkylideneoxy derivative;

X is a member selected from the group consisting of hydrogen having an atomic weight less than 100;

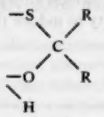
Y is a member selected from the group consisting of (H,H) provided X is hydrogen, oxygen, (H,βOH), (H,βOCOH); and (H,β-halogen) provided X is chlorine or bromine, said β-halogen having an atomic weight of less than 100 and being at least as electronegative as X;

Z is fluorine, chlorine, bromine and iodine;

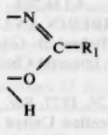
Q is a member selected from the group consisting of hydrogen provided W is a member selected from the group consisting of (H,H) and (H, lower akyl); chlorine; bromine; and OV wherein V is a member selected from the group consisting of hydrogen and an acyl radical of a hydrocarboncarboxylic acid having up to 12 carbon atoms or of benzoic acid substituted by a halogen or methoxy group;

W is a member selected from the group consisting of (H,H); (H, lower alkyl); (H,α-OV_1) wherein V_1 is a member selected from the group consisting of hydrogen and an acyl radical of an acid selected from the group consisting of a hydrocarbonacarboxylic acid having up to 12 carbon atoms, benzoic acid substituted by a halogen or methoxy group, retinoic acid, and isonicotinic acid; =CHT wherein T is a member selected from the group consisting of hydrogen, lower alkyl, fluorine and chlorine, and

W and Q taken together is a member selected from the group consisting of 16α,17α-lower alkylidenedioxy; 16α,17α-cycloalkylidenedioxy; the grouping



wherein R is lower alkyl; and the grouping



wherein R_1 is lower alkyl or phenyl;

M is a member selected from the group consisting of —OR_2 when Q is O-acyl, R_2 being lower alkyl or halogeno lower alkyl; —CHO, acetals, hemiacetals and acylals thereof; —$COOR_3$ wherein R_3 is an alkyl having up to 12 carbon atoms; —CH_2G wherein G is a member selected from the group consisting of hydrogen, halogen having an atomic weight of less than 100, OV_2 wherein V_2 is a member selected from the group consisting of hydrogen and an acyl radical of an acid selected from the group consisting of a hydrocarboncarboxylic acid having up to 12 carbon

atoms, benzoic acid substituted by a halogen or methoxy group, retinoic acid, isonicotinic acid, phosphoric acid and mono- and dialkali, and alkaline earth metals salts thereof; and OV_2 together with OV is a member selected from the group consisting of alkylidene dioxy and alkylorthoalkanoate;

when W is hydrogen, the D-homo analogs thereof.

23. The method of treating an inflammatory condition in a warm-blooded animal responsive to treatment with anti-inflammatory agents which comprises administering to said animal a non-toxic, anti-inflammatory effective amount of a 3,20-dioxo-7α-halogeno-1,4-pregnadiene of claim **1** together with a non-toxic, pharmaceutically acceptable carrier.

4,124,708

NOVEL AGENTS AND NOVEL METHODS FOR INDUCING ABORTIONS

Walter Elger, and Karl Petzoldt, both of Berlin, Fed. Rep. of Germany, assignors to Schering, A.G., Fed. Rep. of Germany

Filed Mar. 25, 1977, Ser. No. 781,275

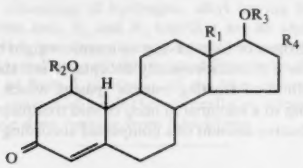
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1976, 2614340

The portion of the term of this patent subsequent to Jun. 14, 1994, has been disclaimed.

Int. Cl.[2] **A61K** *31/56*

U.S. Cl. 424—243 **12 Claims**

1. A pharmaceutical composition comprising, in admixture with a pharmaceutically acceptable carrier, an amount per unit dosage effective to induce abortion in a pregnant female of a 1β-oxy compound of the formula



wherein R_1 is methyl or ethyl, R_2 and R_3 are hydrogen or alkanoyl of 1–8 carbon atoms, and R_4 is hydrogen or ethynyl.

8. A method of inducing abortion in a pregnant human femal comprising administering to the female patient an amount of a composition of claim **1** effective to induce an abortion.

4,124,709

ANOREXIANTS

Bernard J. McLoughlin, and Allen J. Guildford, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jul. 14, 1977, Ser. No. 815,846

Claims priority, application United Kingdom, Jul. 14, 1976, 29297/76

Int. Cl.[2] **A01N** *9/00, 9/22*

U.S. Cl. 424—248.4 **6 Claims**

1. A method of producing anorexia in a warm-blooded animal in need of such treatment which comprises orally or parenterally administering to said animal an anorectically-effective amount of a compound selected from the group consisting of 2-(β-phenyl-trans-vinyl)morpholine in the racemic form, the (2R) isomer thereof and the non-toxic pharmaceutically-acceptable acid-addition salts thereof.

4,124,710

ACETAMIDOXIME DERIVATIVES AND USE THEREOF

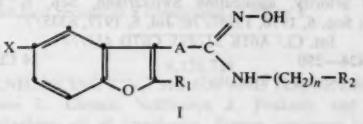
Marcel Descamps, Rosieres, and Alex Areschka, Brussels, both of Belgium, assignors to Labaz, Paris, France

Filed Dec. 9, 1976, Ser. No. 748,725

Int. Cl.[2] **C07D** *295/12;* **A61K** *31/535*

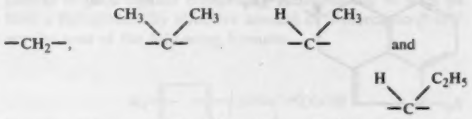
U.S. Cl. 424—248.56 **9 Claims**

1. Compounds of the general formula:



I

and the pharmaceutically acceptable acid addition salts thereof, wherein R_1 represents a branched- or straight-chain alkyl group containing from 1 to 4 carbon atoms or a phenyl group, A represents one of the groups:



R_2 represents a dimethylamino, diethylamino, di-n-propylamino, di-n-butylamino, pyrrolidino, morpholino, piperidino or heptamethyleneimino group or a 1-piperazino group substituted in the 4-position by a straight-chain alkyl group containing from 1 to 4 carbon atoms, X represents a hydrogen or chlorine atom or a methoxy group and *n* is the integer 2 or 3.

6. Method of treating hypertension in a subject in need of such treatment, said method consisting in administering to the said subject an effective amount of at least one compound of formula I as defined by claim **1** or a pharmaceutically acceptable acid addition salt thereof.

4,124,711

DERIVATIVES OF DITHIEPINO[1,4][2,3-C]PYRROLE

Claude Jeanmart, Brunoy, and Andre Leger, Paris, both of France, assignors to Rhone-Poulenc Industries, Paris, France

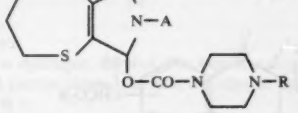
Filed Feb. 17, 1977, Ser. No. 769,737

Claims priority, application France, Feb. 20, 1976, 76 04713; Nov. 22, 1976, 76 35096

Int. Cl.[2] **A61K** *31/55;* **C07D** *513/04*

U.S. Cl. 424—250 **15 Claims**

1. A dithiepino[1,4][2,3-c]pyrrole compound of the formula:



wherein A represents pyrid-2-yl or 1,8-naphthyridin-2-yl, or pyrid-2-yl or 1,8-naphthyridin-2-yl substituted by one halogen, alkyl of 1 through 4 carbon atoms, or alkoxy of 1 through 4 carbon atoms, and R represents alkyl of 1 through 4 carbon atoms or alkenyl of 2 through 4 carbon atoms, and non-toxic pharmaceutically acceptable acid addition salts thereof.

15. A pharmaceutical composition useful as a tranquilliser, anti-convulsant agent, decontracturant and agent to produce hypnosis which comprises an effective amount of a dithiepino[1,4][2,3-c]pyrrole compound as claimed in claim **1**, or

a non-toxic pharmaceutically acceptable acid addition salt thereof, in association with a pharmaceutical carrier.

4,124,712

ERGOT PEPTIDE ALKALOID DERIVATIVES

Peter Stütz, Vienna, Austria, and Paul Stadler, Biel-Benken, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

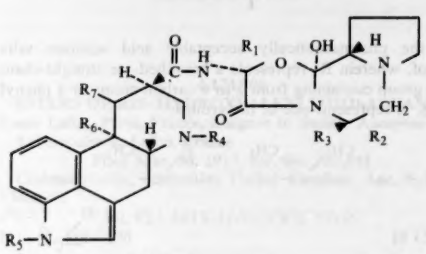
Filed Aug. 30, 1977, Ser. No. 829,206

Claims priority, application Switzerland, Sep. 6, 1976, 11286/76; Sep. 6, 1976, 11287/76; Jul. 6, 1977, 8335/77

Int. Cl.[2] A61K *31/495;* **C07D** *413/14*

U.S. Cl. 424—250 **24 Claims**

1. A compound of formula I,



I

wherein

R_1 is alkyl of 1 to 4 carbon atoms,

R_2 is hydrogen, alkyl of 1 to 4 carbon atoms or benzyl,

R_3 and R_5 are, independently, hydrogen or methyl,

R_4 is hydrogen or alkyl of 1 to 4 carbon atoms, and

R_6 and R_7 together form a single bond, or

R_6 and R_7 are each hydrogen,

R_6 is methoxy, and

R_7 is hydrogen,

in free base form or in pharmaceutically acceptable acid addition salt form.

19. A method of treating angina pectoris, in an animal which comprises administering a therapeutically effective amount of a compound of claim **1** to an animal in need of said treatment.

4,124,713

OXOPYRIDOBENZOXEPIN-ACETIC ACIDS AND DERIVATIVES THEREOF USEFUL AS ANTIINFLAMMATORY AND ANALGESIC AGENTS

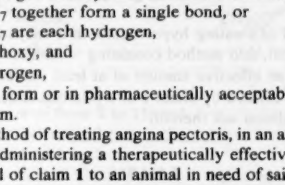
Arthur R. McFadden, East Brunswick, and Daniel E. Aultz, Middlesex, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Division of Ser. No. 607,926, Aug. 26, 1975, Pat. No. 4,025,640. This application Apr. 19, 1977, Ser. No. 788,782

Int. Cl.[2] A61K *31/435;* **C07D** *491/04*

U.S. Cl. 424—256 **12 Claims**

1. A compound of the formula



wherein X together with the carbon atoms to which it is attached is a pyrido ring structure; R is hydrogen or straight or branched chain alkyl of from 1 to 5 carbon atoms R^1 is hydrogen or alkyl of 1 to 4 carbon atoms; R^2 is hydrogen or methyl; n is the integer 1, 2 or 3; and salts thereof prepared from pharmaceutically acceptable bases.

5. A method of treating inflammation which comprises administering to a patient an effective amount of a compound defined in claim **1**.

4,124,714

SUBSTITUTED HYDROXY PYRIDONES

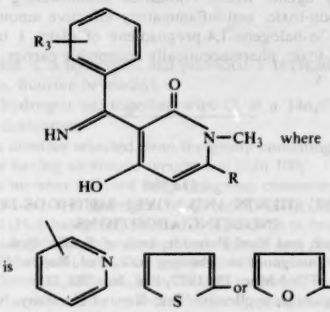
Jeffrey Nadelson, Denville, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 700,065, Jun. 25, 1976, Pat. No. 4,064,251. This application Aug. 5, 1977, Ser. No. 821,989

Int. Cl.[2] A61K *31/44;* **C07D** *211/30*

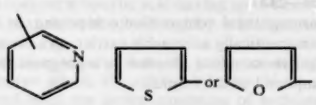
U.S. Cl. 424—263 **5 Claims**

1. A compound of the formula



where

R is



and

R_3 is hydrogen or halo having an atomic weight of about 19 to 36, or a pharmaceutically acceptable salt thereof.

4. A method of treating muscle spasms which comprises administering to a mammal in need of said treatment a muscle-relaxant effective amount of a compound according to claim **1**.

4,124,715

METHOD OF PHARMACOLOGICALLY TREATING DRUG ADDICTION WITH FUSARIC ACID

Jose Pozuelo, 1463 Burlington, Cleveland Hts., Ohio 44118

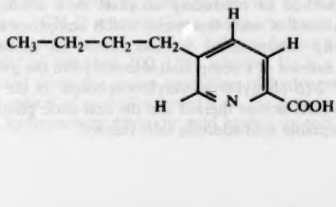
Filed May 16, 1977, Ser. No. 797,410

Int. Cl.[2] A61K *31/455*

U.S. Cl. 424—266 **2 Claims**

1. A pharmacological method of alleviating craving for and withdrawal from narcotics and amphetamines in addicted human beings said method comprising:

administering to a human being addicted to narcotics or amphetamines a therapeutically effective amount of a compound having the following structural formula:



4,124,716

PROCESS FOR THE TREATMENT OF SPASMODIC CONDITIONS IN HUMANS

Peter Emig; Hans Pohle, both of Brackwede; Gerhard Scheffler, Senne; Norbert Brock, Uerentrup; Hans-Dieter Lenke, Ludwigshafen, and Jorg Pohl, Halle, all of Germany, assignors to Asta-werke Aktiengesellschaft, Bielefeld, Germany

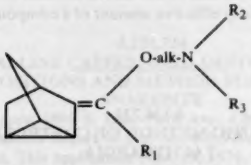
Continuation-in-part of Ser. No. 557,535, Mar. 12, 1975, Pat. No. 4,065,501. This application Oct. 14, 1977, Ser. No. 842,092

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1974, 2413814

Int. Cl.[2] **A61K** *27/00, 31/40, 31/135, 31/445*

U.S. Cl. 424—267 **5 Claims**

1. Process for the treatment of spasmodic conditions in humans comprising administering to a human in need thereof a compound selected from the group consisting of the basic enol ethers having the formula I



(I)

wherein R_1 represents a member selected from the group consisting of the unsubstituted phenyl group and the phenyl group substituted by a member selected from the group consisting of halogen, lower alkyl having from 1 to 4 carbon atoms, nitro, trifluoromethyl, hydroxy and lower alkoxy having from 1 to 4 carbon atoms, "alk" is a member selected from the group consisting of the linear and branched alkylene groups having from 2 to 4 carbon atoms, and R_2 and R_3, which may be the same or different, represent members selected from the group consisting of hydrogen, alkyl having from 1 to 4 carbon atoms and, R_2 and R_3 together are an alpha, omega-polymethylene group containing 5 methylene groups and the pharmacologically acceptable acid addition salts thereof, in a daily dose of from 5 to 60 mg. of the base compound or an equivalent amount of a salt thereof orally or intraperitoneally with a single dose ranging from 5 to 10 mg.

4,124,717

THIAZOLYL ALKYLAMINOETHYLENE COMPOUNDS

Graham J. Durant, Welwyn Garden City; John C. Emmett, Codicote; Charon R. Ganellin, Welwyn Garden City, and Hunter D. Prain, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

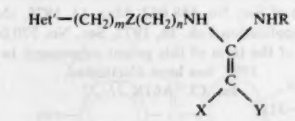
Division of Ser. No. 629,174, Nov. 5, 1975, Pat. No. 4,046,907, which is a continuation-in-part of Ser. No. 468,617, May 9, 1974, Pat. No. 3,953,460. This application May 16, 1977, Ser. No. 797,160

Claims priority, application United Kingdom, May 17, 1973, 23568/73

Int. Cl.[2] **A61K** *31/41, 31/415, 31/425;* **C07D** *417/12*

U.S. Cl. 424—270 **9 Claims**

1. A compound of the formula:



wherein X and Y, which may be the same or different, are hydrogen, nitro, cyano or SO_2Ar but are not both hydrogen; Het' is thiazole unsubstituted or substituted by lower alkyl, hydroxyl, hydrogen or amino; R is hydrogen, lower alkyl or Het-$(CH_2)_mZ(CH_2)_n$; Z is sulphur or methylene; each *m* is 0, 1 or 2 and each *n* is 2 or 3 provided that each sum of *m* and *n* is 3 or 4; Het is an oxazole, isoxazole, triazole, thiazole, isothiazole or thiadiazole ring unsubstituted or substituted by lower alkyl, hydroxyl, halogen or amino; and Ar is phenyl unsubstituted or substituted by halogen or methyl or a pharmaceutically acceptable acid addition salt thereof.

8. A pharmaceutical composition to inhibit H-2 histamine receptors, suitable for oral or parenteral administration, comprising a pharmaceutical carrier and in an amount effective to inhibit said receptors a compound of claim 1.

4,124,718

ENHANCING ZINC SERUM AND TISSUE LEVELS

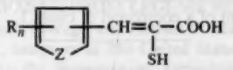
Eugene L. Giroux; Nellikunja J. Prakash, and Paul J. Schechter, all of Strasbourg, France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Filed Jan. 21, 1977, Ser. No. 765,420

Int. Cl.[2] **A61K** *31/40*

U.S. Cl. 424—274 **5 Claims**

1. A method of enhancing zinc serum and tissue levels in a patient in need thereof comprising administering to such patient a therapeutically effective amount of α-mercapto-β-arylacrylic acid of the following formula:



where Z is C=C, O, S or NH; R is H, CH_3, C_2H_5, OH, CH_3O, C_2H_5O, Cl, Br, F, I or CF_3; and *n* is 1, 2 or 3; or the pharmaceutically acceptable non-toxic salt thereof.

4,124,719

-4-PHENYLHEXAHYDRO-4-INDOLINOL DERIVATIVES

Richard Berthold, and Franz Troxler, both of Bottmingen, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 637,313, Dec. 3, 1975, abandoned. This application Apr. 25, 1977, Ser. No. 790,416

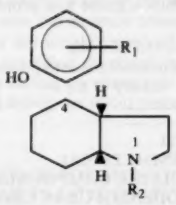
Claims priority, application Switzerland, May 7, 1976, 5753/76; May 31, 1976, 6782/76; Dec. 6, 1974, 16236/74

Int. Cl.[2] **A61K** *31/40, 31/405;* **C07D** *209/08*

U.S. Cl. 424—274 **66 Claims**

1. A compound of formula I,

I



wherein

R_1 is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, fluorine, chlorine or hydroxy, and

R_2 is

(i) alkyl of 1 to 4 carbon atoms,

(ii) alkenyl or alkynyl of 3 to 7 carbon atoms, wherein the multiple bond is located in a position other than α to the nitrogen atom to which R_2 is bound,

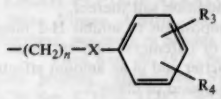
(iii) cycloalkyl of 5 to 7 carbon atoms,

(iv) alkyl of 1 to 4 carbon atoms mono-substituted by cycloalkyl of 3 to 7 carbon atoms,

(v) hydroxyalkyl of 2 to 4 carbon atoms, wherein the hydroxy moiety is attached to a carbon atom other than a carbon atom α to the nitrogen atom to which R_2 is bound,

(vi) a group $-(CH_2)_p-CO-A$, wherein p is a whole number from 1 to 3 and A is alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, or

(vii) a group



wherein R_3 and R_4, independently, are hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, or halogen, and either X is a direct bond, vinylene or carbonyl and n is a whole number from 1 to 5 or X is —O—, —S—, —SO—, $-SO_2-$ or $-NR_5-$, wherein R_5 is hydrogen, phenyl, alkyl of 1 to 4 carbon atoms or alkanoyl of 2 to 4 carbon atoms, and n is a whole number from 2 to 5,

or a pharmaceutically acceptable acid addition salt thereof.

5. A pharmaceutical composition useful in the treatment of depression, comprising an anti-depressant effective amount of a compound of claim **1** in association with a pharmaceutical carrier or diluent.

6. A method of treating depression which comprises administering to an animal in need of such treatment a therapeutically effective amount of a compound of claim **1**.

4,124,720

THERAPEUTIC HYDRODISPERSIBLE EMULSION

Georges E. J. Wenmaekers, 23, rue du General Chanzy, 94, Nogent-sur-Marne, France

Continuation of Ser. No. 481,758, Jun. 21, 1974, abandoned, which is a continuation of Ser. No. 196,745, Nov. 8, 1971, abandoned. This application Mar. 8, 1976, Ser. No. 664,670
Claims priority, application France, Nov. 9, 1970, 70 40221
Int. Cl.[2] A61K *31/335, 31/56, 31/23*
U.S. Cl. 424—278 **19 Claims**

1. A therapeutic composition in the form of an aqueous emulsion, for local application to the skin in the prevention and treatment of cutaneous thermal burns, which comprises about 75% by weight of water and about 25% by weight of a mixture of the following ingredients, on dry basis:

a. 5 to 20% by weight of stearic acid;
b. 1 to 30% by weight of an emulsifying agent;
c. 2 to 40% by weight of a wetting agent;
d. 0.1 to 5% by weight of sodium alginate as a protective colloid;
e. 0 to 60% by weight of waxes and oils; and
f. an organic base consisting of triethanolamine to provide an emulsion having a pH in the vicinity of 6.2.

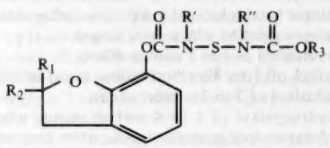
4,124,721

PESTICIDAL UNSYMMETRICAL BIS-ARYLCARBAMATE SULFIDE COMPOUNDS CONTAINING A 2,3, DEHYROBENZOFURAN GROUP

Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jun. 3, 1977, Ser. No. 803,280
Int. Cl.[2] C07D *307/86;* **A01N** *9/12*
U.S. Cl. 424—285 **18 Claims**

1. A compound of the formula:



wherein:

R′ and R″ are the same or different and are alkyl having from 1 to 4 carbon atoms;

R_1 and R_2 are individually hydrogen or alkyl having from 1 to 4 carbon atoms;

R_3 is:

(A) naphthyl, benzodioxolanyl, tetrahydronaphthyl, indanyl or benzothienyl, all of which may be either unsubstituted or substituted with one or more alkyl groups.

(B) phenyl either unsubstituted or substituted with one or more alkyl having from 1 to 12 carbon atoms, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, dialkylamino or nitro groups;

with the proviso that R_3 may not include more than eight aliphatic carbon atoms, except as noted.

7. An insecticidal and nematocidal composition comprising an acceptable carrier and as the active toxicant an insecticidally or nematocidally effective amount of a compound according to claim **1**.

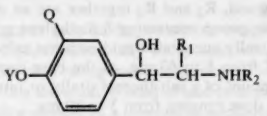
4,124,722

THERAPEUTIC METHOD OF CONTROLLING TACHYCARDIA

Sydney Archer, Bethlehem, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 700,036, Jun. 25, 1976. This application Aug. 4, 1977, Ser. No. 821,884
Int. Cl.[2] A61K *31/25, 31/245, 31/135*
U.S. Cl. 424—308 **2 Claims**

1. A therapeutic method of controlling tachycardia in a mammal in need of such therapy which comprises administering to said mammal an effective amount of a compound having in the free base form the formula



wherein:

R_1 is hydrogen, methyl or ethyl;

R_2 is lower alkyl;

Q is lower alkylthio, lower alkylsulfinyl or lower alkylsulfonyl; and

Y is hydrogen, lower alkanoyl, benzoyl or benzoyl substituted with from 1 to 2 methyl groups;

or an acid-addition salt thereof.

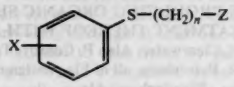
4,124,723

METHOD FOR SUPPRESSING HISTAMINE RELEASE

David B. Reisner, Hightstown; Bernard J. Ludwig, North Brunswick; George M. Fukui, Princeton, all of N.J., and Frank M. Berger, New York, N.Y., assignors to Carter-Wallace, Inc., New York, N.Y.

Continuation of Ser. No. 558,063, Mar. 13, 1975, abandoned. This application Feb. 18, 1977, Ser. No. 770,062
The portion of the term of this patent subsequent to Apr. 22, 1992, has been disclaimed.
Int. Cl.[2] A61K *31/22*
U.S. Cl. 424—311 **5 Claims**

1. A method for suppressing the release of histamine from sensitized leukocytes in a warm blooded animal in need of such treatment which comprises administering internally to said animal, in an amount sufficient to suppress the release of histamine in said animal, a compound selected from the group consisting of a compound having the formula:



Wherein n is a whole integer from 1 to 4; X is halogen and Z is COOH, CH_2OR or CH_2OCR, R being a lower alkyl chain of from 1 to 6 carbon atoms and a pharmaceutically acceptable salt of those compounds wherein Z is COOH.

4,124,724

CRYSTALLINE CAFFEIC ACID DERIVATIVES AND COMPOSITIONS AND METHOD FOR TREATING SNAKEBITE

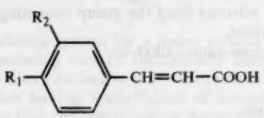
John W. Agoro, 4800 S. Lake Park Ave., Chicago, Ill. 60615

Continuation-in-part of Ser. No. 638,919, Dec. 8, 1975, abandoned. This application Nov. 29, 1976, Ser. No. 744,891

Int. Cl.[2] C07L *69/76*

U.S. Cl. 424—317 **24 Claims**

1.A crystalline product of manufacture of the formula:



wherein R_1 and R_2 are selected from the group consisting of hydroxyl and the caffeoyl group, with the limitation that only one of R_1 and R_2 can be hydroxyl, and the pharmaceutically acceptable salts thereof.

4,124,725

ANTI-INFLAMMATORY METHOD

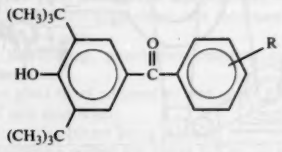
George G. I. Moore, Birchwood, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Filed May 16, 1977, Ser. No. 797,173

Int. Cl.[2] A61K *31/135*

U.S. Cl. 424—330 **1 Claim**

1. A method for combatting inflammatory processes in a mammal which comprises administering to said mammal a dose less than the toxic amount but sufficient to inhibit inflammatory processes in said mammal of a compound of the formula:



wherein R is amino.

4,124,726

ANTI-INFLAMMATORY AGENT OF BENZOYL DERIVATIVE

Yasuhiko Hamazaki, Yachiyo; Shozo Kawabata, Saitama; Toshiyuki Yamamoto, Tokyo; Yasuo Shiraishi, Tokyo; Akira Ueno, Tokyo; Koji Amemiya, Kodaira, and Katsumas Saga, Ichikawa, all of Japan, assignors to Kaken Chemical Co., Ltd., Tokyo, Japan

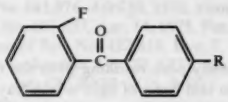
Filed Dec. 28, 1976, Ser. No. 755,069

Claims priority, application Japan, Jan. 1, 1976, 51-232

Int. Cl.[2] C07C *49/80*; A01N *9/24*

U.S. Cl. 424—331 **2 Claims**

1. An anti-inflammatory compound which comprises: a benzophenone compound having the formula:



wherein R is n-butyl or n-amyl.

4,124,727

NUTRITIONALLY BALANCED PROTEIN SNACK FOOD PREPARED FROM LEGUME SEEDS

Louis B. Rockland, Moraga, and Thomas M. Radke, San Pablo, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 20, 1977, Ser. No. 789,375

Int. Cl.[2] A23L *1/20*

U.S. Cl. 426—549 **7 Claims**

1. A process for preparing a nutritionally balanced protein food product with a base of legume seed selected from the group consisting of the genus Phaseolus, the genus Pisum, the genus Vigna, the genus Lens, the genus Cicer, and the genus Soja, which consists of

(a) treating the legume seeds to render them quick-cooking,

(b) cooking the so-treated seeds,

(c) mashing the so-cooked seeds,

(d) mixing the mashed seeds with an amount of methionine-containing material such that the final concentration of methionine in said protein food product is about 2.0–2.6% and of lysine is about 4.0–6.0%, based on the weight of the total protein in the mixture,

(e) adding water to the mixture in an amount sufficient to raise the moisture content thereof to about 45 to 55%, on a dry weight basis, and thereby to form a dough,

(f) extruding the dough into sheets,

(g) cutting the sheets into pieces, and

(h) frying the so-cut pieces in edible oil.

4,124,728

METHOD FOR MONITORING THE CONCENTRICITY OF PLASTIC COATINGS ON OPTICAL FIBERS

Dietrich Marcuse, Lincroft, and Herman M. Presby, Highland Park, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 31, 1977, Ser. No. 764,387

Int. Cl.[2] G01B *9/02*; G01N *21/30*

U.S. Cl. 427—8 **8 Claims**

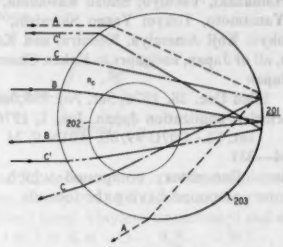
1. A method for monitoring the concentricity of a coating on an optical fiber, said coating being substantially transparent, comprising the steps of:

illuminating said coated fiber with a beam of light from a narrowband source;

observing the backscattered light pattern generated by said beam of light; and

determining the concentricity or eccentricity of said coating on said optical fiber from the absence or presence, respectively, of at least one predetermined intensity peak located

between the central outermost and the central innermost peaks in the backscattered light pattern, said predetermined intensity peak resulting from the rays of minimum deviation in said beam of light which traverses the optical fiber only once.

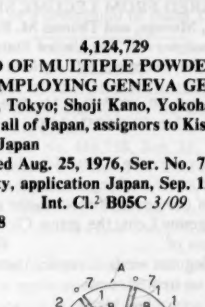


4,124,729

METHOD OF MULTIPLE POWDER COATING EMPLOYING GENEVA GEARS

Shigeru Kubota, Tokyo; Shoji Kano, Yokohama, and Masahiro Kubo, Tokyo, all of Japan, assignors to Kishimoto Sangyo Co., Ltd., Tokyo, Japan

Filed Aug. 25, 1976, Ser. No. 717,617
Claims priority, application Japan, Sep. 12, 1975, 50-110619
Int. Cl.[2] B05C *3/09*
U.S. Cl. 427—58 **2 Claims**



1. A method of multiple powder coating comprising the steps of feeding articles to be coated to a conveyer which comprises a pair of Geneva gears secured to both ends of a rotating shaft of said conveyer, said Geneva gears having a plurality of channels around the peripheral surfaces thereof and said articles being held in said channels, said articles being fed intermittently to said channels at every Y intermittent rotations of said Geneva gears; rotating said conveyer intermittently at an interval of one channel, the total number of intermittent rotations for each of said articles being equal to X times Y, where X is the number of channels around the peripheral surface of each of said Geneva gears and Y is the number of coatings to be applied to said articles, X being an odd number when Y is an even number and X/Y being a decimal number when Y is an odd number; heating said articles to be coated by electric heaters provided around said conveyer during the intermittent rotations of said conveyer; applying powder coatings in a batch provided below said conveyer to each article once in each cycle of the rotations of said conveyer; and removing each of said articles from said gears after X times Y intermittent rotations thereof.

4,124,730

METHOD OF PRODUCING ORGANIC SHORT FIBERS AND TREATMENT THEREOF WITH A SILANE

Frank D. Albert, Clearwater; Alan P. Conroy, Tampa, and David L. Skinner, St. Petersburg, all of Fla., assignors to Jim Walter Resources, Inc., Birmingham, Ala.

Continuation-in-part of Ser. No. 564,731, Apr. 3, 1975, Pat. No. 4,026,478. This application May 27, 1977, Ser. No. 801,231
The portion of the term of this patent subsequent to May 31, 1994, has been disclaimed.
Int. Cl.[2] B05D *7/00*
U.S. Cl. 427—220 **7 Claims**

1. The method of producing inorganic short fibers within a preselected narrow range of aspect ratios from about 30 to about 140 comprising the steps of making a mass of individual, inorganic fibers having diameters within a prescribed range and having a range of aspect ratios substantially from 10^3 to 10^6, said mass further having not less than about 7% shot by weight; putting said mass of fibers through a refiner, said refiner having at least one rotating plate element and a second plate element at a fixed distance from and in facing relation to said one rotating element to reduce the length of said fibers, said fixed distance being substantially less than the lengths of a major quantity of said fibers and greater than the size of said shot and subjecting said refined fibers to the action of a separator whereby fibers with said preselected narrow range of aspect ratios are produced with less than 1% shot, and then reacting the separated short fibers with a silane of the formula:

$$R—Si(OH)_3$$

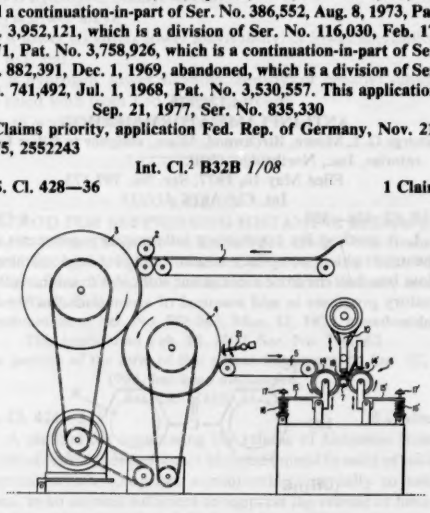
wherein R is selected from the group consisting of:
amino-alkylene,
amino-alkylene-amino-alkylene,
vinyl,
acryloxy,
methacryloxy,
epoxy-cyclohexyl-alkylene,
glycidoxy-alkylene, and
mercapto-alkylene.

4,124,731

NEEDLED NON-WOVEN TUBING

Richard Dilo, Eberbach-N, Fed. Rep. of Germany, assignor to Rontex America Inc., Chelmsford, Mass.

Division of Ser. No. 681,089, Apr. 19, 1976, Pat. No. 4,085,486, and a continuation-in-part of Ser. No. 386,552, Aug. 8, 1973, Pat. No. 3,952,121, which is a division of Ser. No. 116,030, Feb. 17, 1971, Pat. No. 3,758,926, which is a continuation-in-part of Ser. No. 882,391, Dec. 1, 1969, abandoned, which is a division of Ser. No. 741,492, Jul. 1, 1968, Pat. No. 3,530,557. This application Sep. 21, 1977, Ser. No. 835,330
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1975, 2552243
Int. Cl.[2] B32B *1/08*
U.S. Cl. 428—36 **1 Claim**



1. Tubing consisting of a plurality of needled coaxial over-

lapping turns of at least one fibrous web of non-woven fabric, a plurality of fibers integral with each turn angularly extending from said turn inwardly through at least one subjacent turn, said turns being fastened to each other by said angularly inwardly extending fiber and compressed upon each other by being radially inwardly pressed upon a helix.

4,124,732

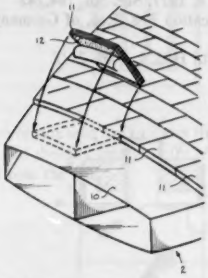
THERMAL INSULATION ATTACHING MEANS

Lubert J. Leger, Friendswood, Tex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 555,750, Mar. 5, 1975, abandoned. This application Apr. 12, 1977, Ser. No. 786,913

Int. Cl.[2] B64C *1/00;* **B32B** *7/00*

U.S. Cl. 428—77 **4 Claims**



1. In an insulating system for a space vehicle formed of a plurality of insulating tiles of substantially chemically pure rigidized silica tiles attached to a metal substrate of the space vehicle, the tiles having a coefficient of thermal expansion markedly lower than the coefficient of the metal substrate, the improvement comprising: a strain isolation pad between each tile and the metal substrate, said pad attached to each tile and the metal substrate by a separate, layer of flexible adhesive bond, having a thickness less than 10 mils, each pad being formed of a plurality of high temperature resistant, flexible, plastic fibers randomly oriented and closely arranged with respect to each other to form a needled felt configuration isolating said tile from thermal and mechanical stresses generated by deformation of said metal substrate of the space vehicle, said fibers being capable of absorbing within a temperature range of −250° F. to 500° F., said stresses by bending.

4,124,733

LAMINATED GLASS UNITS

Richard Melling, Birmingham; Arthur J. Nobbs, Alvechurch, and Andrew Leff, Skelmersdale, all of England, assignors to Pilkington Brothers Limited, St. Helens, England

Continuation of Ser. No. 547,653, Feb. 6, 1975, abandoned, which is a continuation of Ser. No. 221,421, Jan. 27, 1972, abandoned, and a continuation-in-part of Ser. No. 872,370, Oct. 29, 1969, abandoned. This application May 3, 1977, Ser. No. 793,299

Claims priority, application United Kingdom, Oct. 31, 1968, 51746/68

Int. Cl.[2] B32B *7/02, 17/00, 27/42*

U.S. Cl. 428—212 **2 Claims**

1. A laminated glass windscreen comprising:

a thin, annealed, outer glass sheet of a thickness within the range 0.5 to 3.0 mm;

a flexible, transparent, penetration-resistant interlayer of plastics material;

a thin, inner glass sheet adhered to said outer glass sheet by means of said interlayer;

said thin inner glass sheet being a sheet

(a) of a thickness within the range 0.5 to 3.0 mm, and

(b) which has been thermally toughened to provide a central tensile stress within the range of 380 kg/cm^2 to 560 kg/cm^2 and which in such that additional stress induced upon the bending of the windscreen by the impact of an object such as a human head with the thin, inner sheet causes powdery fragmentation of the inner glass sheet when it breaks.

4,124,734

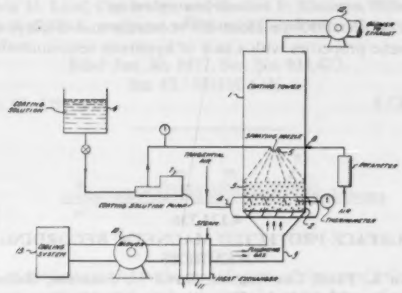
ENCAPSULATED PARTICLES

David S. Alterman, Parsippany, and Kil W. Chun, Ridgefield Park, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 681,876, Apr. 30, 1976, abandoned, which is a division of Ser. No. 567,677, Apr. 14, 1975, Pat. No. 3,983,254, which is a division of Ser. No. 422,813, Dec. 7, 1973, Pat. No. 3,908,045. This application Apr. 20, 1977, Ser. No. 789,038

Int. Cl.[2] B32B *5/16, 9/00*

U.S. Cl. 428—403 **1 Claim**



1. Encapsulated particles of an oxidizing material having at least one reactive chlorine atom in its molecular structure and being selected from the group consisting of chlorinated trisodium phosphate, calcium hypochlorite, lithium hypochlorite, monochloramine, dichloroamine, nitrogen trichloride, 1,3-dichloro-5,5-dimethyl hydantoin, paratoluene solfondichloroamide, trichloromelamine, N-chloroammeline, N-chlorosuccinimide, N,N'-dichloroazodicarbonamide, N-chloroacetylurea, N,N'-dichlorobiuret, chlorinated dicyandiamide and dichloroglycoluril, said particles having thereon a complete and continuous inner and outer coating, the inner coating comprising a saturated fatty acid having from 12 to 20 carbon atoms or mixtures thereof, and the outer coating comprising a sodium salt of said acid or mixtures thereof; said inner coating being completely encapsulated by said sodium salt.

4,124,735

MAGNETIC GLASS CARRIER MATERIALS

Michael P. O'Horo, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

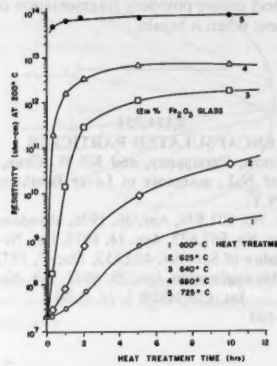
Filed Dec. 2, 1976, Ser. No. 747,117

Int. Cl.[2] B32B *7/10;* **C03C** *3/22;* **G03G** *9/14*

U.S. Cl. 428—406 **12 Claims**

7. A low density, magnetic composite electrostatographic carrier particle comprising alumino-boro-silicate glass containing about 40 molar percent SiO_2, about 30 molar percent B_2O_3, about 20 molar percent CaO, and about 10 molar percent Al_2O_3, said alumino-boro-silicate glass also containing from between about 10 to about 15 molar percent Fe_2O_3 in which superparamagnetic Fe_3O_4 ferrite crystallites having an average particle size of up to about 500 A have been precipitated by heat treatment of said glass at temperatures in the range of

between about 600° C. and about 800° C. for up to about 24 hours, wherein said carrier particle has a resistivity on the



order of about 10^6 to about 10^{12} ohm/cm and displays soft magnetic properties with a lack of hysteresis behavior.

4,124,736

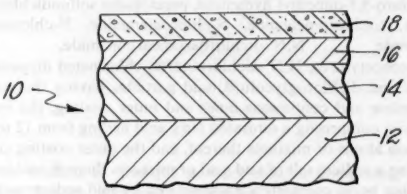
SURFACE PROTECTED MAGNETIC RECORDING MEMBERS

Pravin K. Patel, Los Angeles; David H. Johnston, Redondo Beach, and John Makaeff, Los Angeles, all of Calif., assignors to Poly-Disc Systems, Inc., Torrance, Calif.

Filed Oct. 29, 1974, Ser. No. 518,461

Int. Cl.[2] H01F *10/00*

U.S. Cl. 428—622 **8 Claims**



1. In a magnetic recording member having a substrate, a magnetic recording alloy layer supported on the surface of said substrate and a protective covering on the surface of said magnetic recording alloy layer the improvement which comprises:

said protective covering including a barrier layer located on the surface of said alloy layer and an oxide layer located on the surface of barrier layer,

said barrier layer consisting of at least one non-magnetic metal which is substantially inert under the conditions which are employed in forming said oxide layer, and serving to physically separate said magnetic recording alloy layer from said oxide layer,

said oxide layer consisting essentially of a non-magnetic oxide composition of at least one metal, said oxide layer being sufficiently hard so as to protect said magnetic recording member against abrasion,

each of said layers being of a uniform composition, being continuous and being of a uniform thickness.

4,124,737

HIGH TEMPERATURE WEAR RESISTANT COATING COMPOSITION

Thomas A. Wolfla, Indianapolis, and Robert C. Tucker, Jr., Brownsburg, both of Ind., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,723

Int. Cl.[2] B32B *15/00;* **C22C** *19/05*

U.S. Cl. 428—640 **17 Claims**

1. A coating composition for producing high temperature wear-resistance coating consisting essentially of 17–35 Wt.% chromium; 5–20 Wt.% tantalum; 0.5 to 3.5 carbon, balance Co.

4,124,738

SEAL CONSTRUCTION FOR PRIMARY CELLS

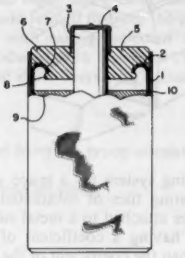
Werner Riedl, Ellwangen, Fed. Rep. of Germany, assignor to Varta Batterie Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 4, 1977, Ser. No. 784,242

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1976, 2619177

Int. Cl.[2] H01M *2/00, 2/12*

U.S. Cl. 429—56 **5 Claims**



1. A galvanic primary element having a cylindrical cell cup closed by a synthetic plastic sealing element,

the cell cup having a crimped rim which engages the underside of the sealing element,

the rim of the cell cup being crimped to the extent of at least 140°, and at most about 190°,

the bottom of the sealing element having a flanged portion against which the crimped portion bears in closed and sealing configuration to the extent of at least 50° and at most about 100°, and

the end of the crimped portion abutting in self-limiting manner against a protrusion from the sealing element.

4,124,739

ALKALI METAL-SULPHUR CELLS

James L. Sudworth, Burton-on-Trent, England, assignor to Chloride Silent Power Ltd., London, England

Continuation of Ser. No. 634,010, Nov. 21, 1975, abandoned. This application Jun. 20, 1977, Ser. No. 808,012

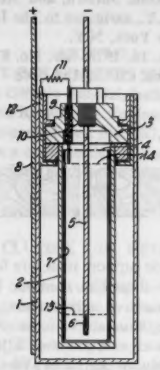
Claims priority, application United Kingdom, Nov. 28, 1974, 51637/74

Int. Cl.[2] H01M *10/39*

U.S. Cl. 429—61 **10 Claims**

1. An arrangement for controlling an operating cycle of an alkali-metal/sulphur cell comprising an anode compartment containing alkali metal, a cathode compartment containing sulphur material, a solid electrolyte which is an alkali-metal ion conductor separating said anode and cathode compartments, an alkali-metal reservoir in communication with said anode compartment for supplying alkali metal to said anode compartment and respective current collecting poles for the anode and cathode compartments, said arrangement including detecting means in the form of an electronically conducting rod extending down into said reservoir to a predetermined high level and electrically connected to said current collecting pole for the cathode compartment of the cell, whereby when said rod is contacted by the upper surface of the alkali-metal in said reser-

voir when said alkali metal reaches said predetermined high level during a charging cycle, an electric circuit is completed between the current collecting poles through the alkali-metal



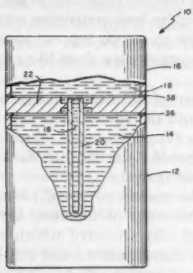
in said reservoir via said rod to shunt the cathode compartment of the cell, and thereby substantially reduce the flow of charging current into the cell.

4,124,740

SODIUM-SULFUR BATTERY

Robert R. Dubin, Ballston Lake, N.Y., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Dec. 27, 1977, Ser. No. 864,732
Int. Cl.[2] H01M *10/39*
U.S. Cl. 429—104 **24 Claims**



1. A sodium sulfur battery, comprising:

(a) first means for containing sulphur in a molten state;

(b) second means for containing sodium in a molten state, said second means including a beta-alumina electrolyte tube located at least partially within the sulfur in said sulfur containing means; and

(c) means for physically separating the sulfur in said first means from the sodium in said second means, said separating means including a header located between said first and second means and having an inner circumferential surface defining an opening through which said beta-alumina tube extends, said surface forming a continuous mechanical seal around and against said tube sufficient to prevent said sulfur or sodium from passing therebetween.

4,124,741

HYDROGEN/CHLORINE ELECTROCHEMICAL ENERGY STORAGE SYSTEM

Thomas G. Hart, Royal Oak, Mich., assignor to Energy Development Associates, Madison Heights, Mich.

Filed Mar. 4, 1977, Ser. No. 774,700
Int. Cl.[2] C25B *11/12*
U.S. Cl. 429—105 **15 Claims**

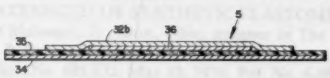
1. An HCl electrochemical energy storage system comprising a cell having therein an aqueous hydrochloric acid electrolyte in which at least a portion of the HCl is present in disassociated form and an electrode therein of ungraphitised carbon, and a non-halogen electrode, and communicating with said cell, means for storing hydrogen comprising graphitised carbon.

4,124,742

ELECTRICAL CELLS AND BATTERIES AND METHODS AND APPARATUS FOR MAKING THE SAME

Edwin H. Land, Cambridge, and Gordon F. Kinsman, Billerica, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 30, 1977, Ser. No. 811,472
Int. Cl.[2] H01M *6/12*
U.S. Cl. 429—122 **8 Claims**



1. A laminate useful in the manufacture of electrical cells and comprising a sheet of conductive plastic, a dry layer of active electrode particles adhered to a central region of said conductive plastic sheet and entirely within the borders of said sheet, and a dry layer of regenerated cellulose adhered to said electrode particles and said conductive plastic with a water soluble bonding agent.

4,124,743

MERCURY-FREE SECONDARY ALKALINE BATTERY AND IMPROVED NEGATIVE INTERSEPARATOR THEREFOR

Roland F. Chireau, Quaker Hill, Conn., and Aldo S. Berchielli, Westerly, R.I., assignors to Yardney Electric Corporation, Pawcatuck, Conn.

Filed Oct. 13, 1977, Ser. No. 841,864
Int. Cl.[2] H01M *10/26*
U.S. Cl. 429—144 **11 Claims**

1. An improved secondary alkaline battery, said battery being mercury-free and comprising:

A. at least one positive electrode;

B. at least one zinc negative electrode;

C. a main separator;

D. a positive interseparator;

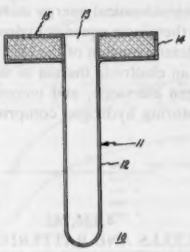
E. a negative interseparator between said zinc electrode and said main separator and containing a reservoir of electrolyte-soluble additive which, during operation of said battery, yields cations forming a protective coating on said zinc electrode and exhibiting either a hydrogen overvoltage of the order of at least about 1 volt or a reversible potential positive with respect to hydrogen; and

F. an alkaline electrolyte, the concentration of said additive in said negative interseparator being sufficient to protect said zinc electrode during the normal operation life of said electrode.

4,124,744
COMPOSITE SOLID ELECTROLYTE BODY

Bruce S. Dunn, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 17, 1977, Ser. No. 852,242
Int. Cl.[2] H01M 6/20
U.S. Cl. 429—193 2 Claims

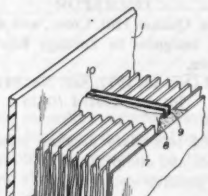


1. A composite body comprising a body of a solid ion-conductive electrolyte material, the body having a casing portion with one open end and a header portion integral with the casing portion adjacent its open end, and a surface portion of an ion-insulating material on only the exterior surfaces of the header portion of the body.

4,124,745
ACCUMULATOR WITH PLATE ELEMENT HAVING A RIB FOR SECURING TO CELL WALL

Karl Knapp, Luthe, and Siegfried Prause, Berenbostel, both of Germany, assignors to Varta Batterie AG, Hanover, Germany

Filed Mar. 19, 1976, Ser. No. 668,502
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1975, 2516729
Int. Cl.[2] H01M 10/16
U.S. Cl. 429—208 12 Claims



1. An accumulator having at least one single cell;
said cell comprising a cell case in which is arranged a plate block constructed of positive electrode plates, negative electrode plates and separators;
lugs on the plates of each polarity connected by pole connecting straps;
a rib bonded in fixed connection with the electrode plates and the separators at the top surface of the plate block; and
said rib also bonded to the end walls of the cell case.

4,124,746
BIPOLAR ELECTRODE SUPPORT STRUCTURES

George F. Nordblom, Yardley, Pa.; Pierre P. Turillon, Ramsey, N.J.; Ernest L. Huston, Suffern, and Stephan L. Keresztes, Warwick, both of N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Feb. 16, 1978, Ser. No. 878,268
Int. Cl.[2] H01M 6/48
U.S. Cl. 429—210 13 Claims

1. A bipolar electrode support structure for use in a lead-acid battery comprising a sheet-like member having a first side adapted to support positive active mass and a second side adapted to support negative active mass wherein:
(i) at least a portion of said member adjacent said first side comprises a continuous matrix of a metal selected from the group consisting of titanium, tantalum, niobium and zirconium, or of an alloy of said metal which alloy exhibits valve metal-like electrical characteristics;
(ii) said matrix has tortuous paths therethrough, the volume of which constitutes about 15 to 55% of the combined volume of said matrix and paths;
(iii) said paths are filled adjacent said first side with essentially lead dioxide such that in use said dioxide blocks entry of battery electrolyte into said matrix;
(iv) at least part of the remainder of said paths is filled with lead or a lead alloy in electronic conductive contact with said matrix and said dioxide;
(v) the extent of penetration of said dioxide from said first side is such as to ensure that in operation the voltage drop between said first side and the lead dioxide-lead metal or alloy interface is sufficient to inhibit substantially anodic formation of any oxidic product of metal at said interface; and
(vi) said first side includes a rim portion adjacent the whole perimeter of said member, said rim portion being characterized in that less than 10% of the outer surface thereof is constituted by lead-containing material.

10. A bipolar electrode support structure for use in a lead-acid battery comprising a sheet-like composite member which includes:
a solid sheet of an electronically conductive material selected from the group consisting of titanium, tantalum, niobium, zirconium, and alloys thereof which exhibit valve metal-like electrical characteristics which is inert to battery electrolyte;
a continuous matrix of metal or alloy selected from the group consisting of titanium, tantalum, niobium, zirconium, and alloys thereof which exhibit valve metal-like electrical characteristics, said matrix being metallurgically bonded to a surface of said solid sheet and having therein a plurality of tortuous paths, the volume of which constitutes about 15–55% of the combined volume of said matrix and said paths;
any of said paths which communicate with the matrix surface remote from said solid sheet having lead dioxide therein such that in use said dioxide blocks entry of battery electrolyte into said matrix;
at least part of the remainder of said paths being filled with lead or a lead alloy in electronic conductive contact with said matrix and said dioxide;
the extent of penetration of said dioxide from said remote surface being such as to ensure that in operation the voltage drop between said remote surface and the lead dioxide-lead metal or alloy interface is sufficient to inhibit substantial anodic formation of any oxidic products of metal at said interface; and

the relative dimensions of said solid sheet and said matrix being such that a rim-portion of said solid sheet adjacent the whole perimeter of said solid sheet is not covered by said matrix.

4,124,747

CONDUCTIVE POLYOLEFIN SHEET ELEMENT

Angelo Murer, and Ottavio Amadei, both of Brussels, Belgium, assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 767,113, Feb. 9, 1977, abandoned, which is a continuation of Ser. No. 583,614, Jun. 4, 1975, abandoned. This application May 31, 1977, Ser. No. 801,543

Claims priority, application United Kingdom, Jun. 4, 1974, 24665/74

Int. Cl.[2] C08K *3/04;* **H01B** *1/04*

U.S. Cl. 429—210 **9 Claims**

1. An electrically conductive nonporous polyolefin element comprising a homogeneous mixture of a crystalline propylene-ethylene copolymer containing from 20 mole % to 35 mole % ethylene and at least 30 parts by weight of finely divided conductive carbon per 100 parts by weight of copolymer, said element being in the form of a thin sheet having a thickness of from about 150 microns to about 500 microns and said element having an electric resistivity below about 10 ohm-cm as determined by ASTM Test Method D-257-61.

4,124,748

CROSS-LINKED SAPONIFIED ABSORBENT POLYMER

Masanori Fujimoto, Ibaraki; Kozo Tsuji, and Tsuneyuki Nagase, both of Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 19, 1976, Ser. No. 743,332

Claims priority, application Japan, Nov. 27, 1975, 50-141931

Int. Cl.[2] C08F *8/12, 8/44*

U.S. Cl. 526—8 **16 Claims**

1. A method for the preparation of a water insoluble, water absorbent polymer having a water absorbency of more than 10 times its own weight of water, comprising the steps of:

(I) providing a crosslinked copolymer consisting of

(1) a vinyl ester of a saturated carboxylic acid, (2) 5–95 mole % of acrylic acid, methacrylic acid, crotonic acid, itaconic acid, maleic acid, fumaric acid, maleic anhydride, itaconic anhydride, methyl acrylate, ethyl acrylate, n-propyl acrylate, iso-propyl acrylate, n-butyl acrylate, tert-butyl acrylate, methyl methacrylate, ethyl methacrylate, n-propyl methacrylate, iso-propyl methacrylate, n-butyl methacrylate, tert-butyl methacrylate, acrylamide or methacrylamide and (3) a crosslinking agent made by either (a) polymerising (1) and (2) in the presence of 0.005 to 20 mole % of (3) based on the total monomers, or (b) crosslinking a copolymer consisting essentially of (1) and (2) in the presence of 0.005 to 20 mole % of (3) based on the total monomer units in the copolymer, and

(II) saponifying said crosslinked copolymer to obtain a saponified copolymer having a saponification degree of at least 50 mole % of (1), and at least 30 mole % of (2) in the crosslinked copolymer, respectively.

11. A method according to claim **1** wherein all or substantially all of component (2) in the saponified copolymer is an alkali salt of the carboxylic acid.

14. An absorbent polymer obtained by the method of claim **11**.

4,124,749

ARYL MERCURY CONTAINING POLYMERS

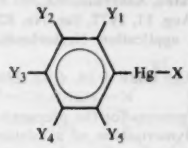
Shaul M. Aharoni, Morris Plains, N.J., assignor to Allied Chemical Corporation, Morristown, N.J.

Filed Mar. 7, 1977, Ser. No. 775,345

Int. Cl.[2] C08F *8/42*

U.S. Cl. 526—15 **18 Claims**

1. A method of producing a solid polymeric composition containing an arylmercurioxycarbonyl radical which comprises reacting in solution a polymer selected from the group consisting of homopolymers and copolymers of maleic anhydride and acrylic acid, methacrylic acid and esters thereof, said polymer containing a pendant organic radical selected from the group consisting of —COOH, —COOM, —CO—O—CO—, —COOR and mixtures thereof, wherein R is alkyl and M is a metal or ammonium cation, said polymer being essentially free of affixed alcoholic —OH groups, with an aryl mercury compound of the formula:



wherein the substituents Y_1 to Y_5 can be the same or different and are independently selected from the group consisting of hydrogen, halogen, alkyl, alkoxy, phenyl, nitro and alkylthio and X is selected from the group consisting of halogen, hydroxy and alkylcarbonyloxy, in the presence of a solvent for the polymer, at a temperature of 140° to 180° C.

4,124,750

GREEN STRENGTH OF SYNTHETIC ELASTOMERS

Joseph F. O'Mahoney, Jr., Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 685,832, May 13, 1976, Pat. No. 4,103,077. This application Sep. 23, 1977, Ser. No. 836,168

Int. Cl.[2] C08F *8/30*

U.S. Cl. 526—20 **7 Claims**

1. A synthetic elastomer composition having improved green strength, comprising:

a partially cross-linked and non-vulcanized synthetic elastomer,

from about 0.25 to about 2.0 parts by weight per 100 parts of said elastomer of a dihydrazide compound having the formula NH_2-NH-CO-R-CO-NH-NH_2

where R is an alkyl group having from 2 to 10 carbon atoms,

said synthetic elastomer made from monomers selected from the group consisting of dienes having from 4 to 10 carbon atoms, comonomers of dienes having from 4 to 10 carbon atoms to form copolymers, and comonomers of dienes having from 4 to 10 carbon atoms with olefin monomers having from 2 to about 14 carbon atoms to form copolymers.

4,124,751

PROCESS FOR PREPARING ACRYLIC ACID OR METHACRYLIC ACID ESTER POLYMER HAVING A HIGH ISOTACTICITY AND A NARROW MOLECULAR WEIGHT DISTRIBUTION

Johann P. Fischer, Konigstein, Taunus; Friedrich Cavagna; Eduard Duch, both of Hofheim am Taunus, and Karl-Friedrich Muck, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 1, 1977, Ser. No. 829,874

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1976, 2639669

Int. Cl.[2] C08F *4/72, 220/10, 220/14*

U.S. Cl. 526—82 **10 Claims**

1. A process for the preparation of a methacrylic acid or acrylic acid ester polymer having a weight average molecular weight of from 2,000 to 100,000, a range of the molecular weight distribution of less than 1.5 and an isotacticity of at least 90%, which comprises polymerizing a methacrylic acid or acrylic acid C_1 to C_4 alkyl ester in an inert non-polar organic

solvent, at a temperature of from −94° to +30° C. in the presence of a magnesium-organic compound which is a phenylmagnesium halide having at least one alkyl or alkoxy substituent in ortho position to the magnesium.

4,124,752

PROCESS FOR THE PREPARATION OF SBR-RUBBERS EMPLOYING BIS(1-HYDROPEROXY CYCLOHEXYL)PEROXIDE

Hendrik H. J. Oosterwijk, Schalkhaar, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

Filed Aug. 11, 1977, Ser. No. 823,762

Claims priority, application Netherlands, Aug. 16, 1976, 7609074

Int. Cl.[2] C08F *4/36, 4/42, 236/00*

U.S. Cl. 526—94 **4 Claims**

1. An improved process for the preparation of SBR-rubber by emulsion copolymerization of a mixture of styrene and butadiene in the presence of a redox system comprising an organic hydroperoxide initiator and an activator system comprising a metal salt, a reducing compound, and a complexing agent for the metal salt, wherein the improvement comprises using bis (1-hydroperoxy cyclohexyl)peroxide as the initiator.

4,124,753

PROCESS FOR THE PREPARATION OF ETHYLENE POLYMER TELOMER WAXES EMPLOYING NON-TOXIC 2-T-BUTYLAZO-2-CYANOBUTANE AT ABOUT 140° C GIVING HIGH PRODUCTION RATES AND LOWER REACTOR FOULING

John E. Dench, Randolph, and Manfred K. Seven, Long Valley, both of N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 625,300, Oct. 23, 1975, abandoned. This application Dec. 12, 1977, Ser. No. 859,781

Int. Cl.[2] C08F *4/04;* **C07C** *69/66*

U.S. Cl. 526—208 **16 Claims**

1. In the process for preparing wax telomer polymers of ethylene having a penetration hardness of less than about 3 determined according to ASTM test D 1321-55T, by vapor phase reaction of a feed stream containing ethylene, a telogen and a free radical initiator, the improvement which comprises carrying out the reaction at above 140° C. and utilizing as intiator 2-t-butylazo-2-cyanobutane at conversions of between 55 to 75 percent.

4,124,754

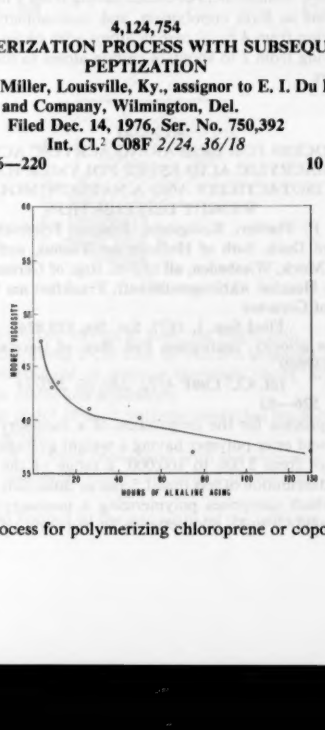
POLYMERIZATION PROCESS WITH SUBSEQUENT PEPTIZATION

Kenneth L. Miller, Louisville, Ky., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 14, 1976, Ser. No. 750,392

Int. Cl.[2] C08F *2/24, 36/18*

U.S. Cl. 526—220 **10 Claims**



1. In a process for polymerizing chloroprene or copolymerizing chloroprene with up to 20 weight percent of another organic, unsaturated monomer, based on the weight of chloroprene, in the presence of elemental sulfur,

the improvement of conducting the polymerization or copolymerization in the absence of chain transfer agents in an aqueous, alkaline emulsion in the presence of 0.25–0.45 part of sulfur per 100 parts of the total organic monomer or monomers present to a conversion of at most 74%; terminating the polymerization and initiating peptization by addition to the resulting polymer latex of a tetraalkylthiuram disulfide equivalent to 0.3–1.5 parts of tetraethylthiuram disulfide; all parts being by weight; adding a water-soluble dialkyldithiocarbamate in an amount equivalent to sodium dibutyldithiocarbamate in a weight ratio to the tetraalkylthiuram disulfide equivalent to tetraethylthiuram disulfide of at least 0.8:1, and continuing the peptization until it is about 85–95% complete; and isolating the polymer.

4,124,755

11-ALKANOYL-4″-DEOXY-4″-ISONITRILO-OLEANDOMYCIN DERIVATIVES

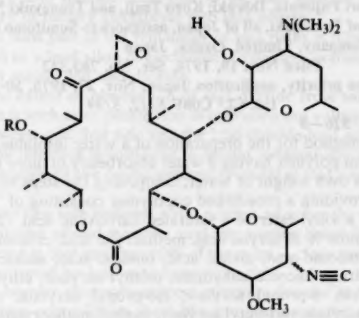
Gene M. Bright, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jan. 3, 1978, Ser. No. 866,721

Int. Cl.[2] C07H *17/08;* **A01N** *9/00*

U.S. Cl. 536—9 **2 Claims**

1. A compound selected from the group consisting of:



and a pharmaceutically acceptable acid addition salt thereof, wherein R is alkanoyl having from two to three carbon atoms.

4,124,756

3-DE-O-METHYLFORTIMICINS

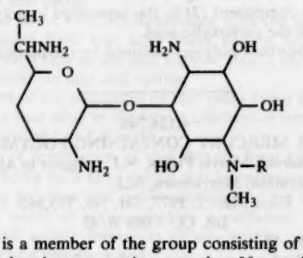
Jerry R. Martin, and John S. Tadanier, both of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 27, 1976, Ser. No. 754,670

Int. Cl.[2] C07H *15/22*

U.S. Cl. 536—17 **8 Claims**

1. A compound of the formula



wherein R is a member of the group consisting of hydrogen, lower acyl, lower amino acyl, N-monoloweralkyl

loweraminoacyl, N,N-di-loweralkyl loweraminoacyl, hydroxy-substituted loweraminoacyl, loweralkyl, loweraminoalkyl, N-monoloweralkyl loweraminoalkyl, N,N-dilowerallkyl loweraminoalkyl, or hydroxysubstituted loweraminoalkyl and the pharmaceutically acceptable salts thereof.

4,124,757

PROCESS FOR PREPARING 2,2'-ANHYDRO-1β-D-ARABI NOFURANOSYL-5-FLUOROCYTOSINE AND SALTS

Max Hoffer, Nutley, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jan. 11, 1973, Ser. No. 322,837
Int. Cl.[2] C07H *19/08*
U.S. Cl. 536—23 4 Claims

1. In a process for the preparation of 2,2'-anhydro-1-beta-D-arabinofuranosyl-5-fluorocytosine and its acid addition salts by the selective hydrolysis of 3'-O-acyl-2,2'-anhydro-1-beta-D-arabinofuranosyl-5-fluorocytosine or an acid addition salt thereof, the improvement which comprises conducting said acid hydrolysis in an acid medium comprising a mineral acid in aqueous or a C_{1-14} alkanol medium at a pH below about 0 at the reflux temperature of the reaction mixture for up to about 45 minutes so as to selectively hydrolyze the acyl group at the oxygen atom on the 3'-position starting compound and whereby said product 2,2'-anhydro-1-beta-D-arabinofuranosyl-5-fluorocytosine and its acid addition salts is crystallized directly from said reaction medium.

4,124,758

AMINATED HYDROXYALKYL CELLULOSE

Lewis W. Watts, Jr., and Ernest L. Yeakey, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Aug. 29, 1977, Ser. No. 828,800
Int. Cl.[2] C08B *11/00*
U.S. Cl. 536—43 6 Claims

1. An aminated cellulose derivative prepared by the reductive amination of a hydroxyalkyl cellulose by reaction with ammonia or ammonium hydroxide or an alkyl amine at 160° C. to 250° C. and under 750–4000 psig pressure in presence of hydrogen and a reducing catalyst comprising a metal selected from the group consisting of copper, nickel, cobalt, chromium, aluminum, maganese, platinum, palladium, and rhodium, oxides of said metals and mixtures of the foregoing.

4,124,759

PREPARATION OF AURANOFIN BY O-ACETYLATION

David T. Hill, North Wales, Pa.; Ivan Lantos, Blackwood, N.J., and Blaine M. Sutton, Hatboro, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Jun. 30, 1977, Ser. No. 812,016
Int. Cl.[2] C07H *23/00*
U.S. Cl. 536—121 4 Claims

1. The method of preparing S-triethylphosphinegold 2,3,4,6-tetra-O-acetyl-1-thio-β-D-glucopyranoside comprising reacting S-triethylphosphinegold 1-thio-β-D-glucopyranoside with an excess of acetic anhydride or about 4 mole equivalents of acetyl chloride in the presence of an excess of a tertiary organic amine base.

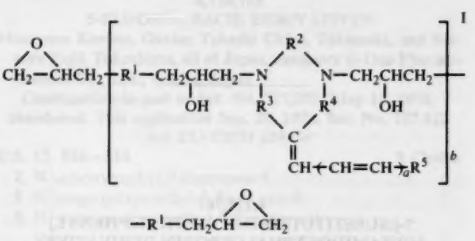
4,124,760

PHOTOPOLYMERIZABLE DIEPOXIDES CONTAINING A NITROGEN HETEROCYCLE

George E. Green; Bernard P. Stark, both of Stapleford, and John S. Waterhouse, Cherry Hinton, all of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 13, 1977, Ser. No. 815,332
Claims priority, application United Kingdom, Jul. 20, 1976, 30100/76
Int. Cl.[2] C07D *405/14*
U.S. Cl. 542—432 8 Claims

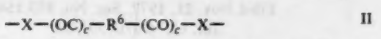
1. Diepoxides of the formula



I

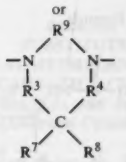
where

each R^1 represents a residue of formula



II

or



III

R^2 represents a carbonyl group,

R^3 represents a single bond joining the indicated nitrogen atom and carbon atom, a carbonyl group, a methylene group, a ketomethylene group, or a methylene or ketomethylene group substituted by at least one and at most two substituents which are halogen atoms, alkyl or alkoxy groups of 1 to 4 carbon atoms, or hydroxy groups,

R^4 represents a carbonyl group, a methylene group, a ketomethylene group, or a methylene or ketomethylene group substituted by at least one and at most two substituents which are halogen atoms, alkyl or alkoxy groups of 1 to 4 carbon atoms, or hydroxy groups,

R^5 represents an aliphatic group of 2 to 10 carbon atoms having ethylenic unsaturation in conjugation with the indicated double bond attached to the carbon atom shown in the heterocyclic ring, or an aromatic group of up to 10 carbon atoms having its aromaticity in conjugation with the indicated double bond attached to the carbon atom shown in the heterocyclic ring,

R^6 represents a divalent aliphatic, aromatic, or heterocyclic group; a divalent aliphatic group having an oxygen atom, sulfur atom, secondary amino group or tertiary amino group within the carbon chain; an aromatic group having oxygen atoms, sulfur atoms, secondary amino groups or tertiary amino groups linking aromatic rings; or a heterocyclic group having oxygen atoms, sulfur atoms or secondary amino groups or tertiary amino groups linking heterocyclic rings,

R^7 and R^8, which may be the same or different, each represent a hydrogen atom, an alkyl group of 1 to 6 carbon atoms, or together represent a pentamethylene or hexamethylene group,

R^9 represents a carbonyl group or a ketomethylene group

at least one of R^3 and R^4 having a carbonyl group adjacent to the indicated carbon atom in the heterocyclic ring and R^3, R^4, and R^9 being selected such that the indicated heterocycle is a 5 or 6 membered ring.

X represents an oxygen atom, a sulfur atom, a secondary amino group, or tertiary amino group,

a represents zero, 1, or 2,

b represents an integer such that the average molecular weight of the diepoxide is from 500 to 50,000, and

c is zero or one, such that *c* may only represent 1 when X represents an oxygen atom.

4,124,761

7-[(SUBSTITUTED-THIOMETHYL)PHENYL] ACETAMIDOCEPHALOSPORIN DERIVATIVES

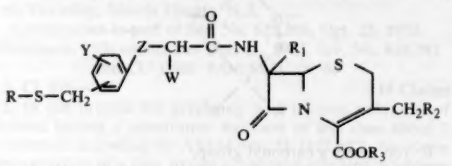
Abraham Nudelman, Rehovot, and Abraham Patchornik, Ness-Ziyona, both of Israel, assignors to Yeda Research and Development Co. Ltd., Rehovot, Israel

Filed Nov. 21, 1977, Ser. No. 853,154

Int. Cl.[2] C07D *501/36*

U.S. Cl. 544—27 **7 Claims**

1. A compound of the formula



wherein R is a lower alkyl group of from 1 to 4 carbon atoms, 1,3,4-thiadiazol-2-ylthio, 5-methyl-1,3,4-thiadiazol-2-ylthio, tetrazol-5-ylthio, 1-methyltetrazol-5-ylthio, 1,3,4-oxadiazol-2-ylthio, 5-methyl-1,3,4-oxadiazol-2-ylthio, 1,3,4-triazol-2-ylthio, 5-methyl-1,3,4-triazol-2-ylthio, 1,2,3-triazol-5-ylthio, 5-amino-1,3,4-thiadiazol-2-ylthio, (4,5-dihydro-4-oxo-2-thiazolyl)thio or cyano; Y is hydrogen, chlorine, bromine, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, or an alkoxy group of from 1 to 4 carbon atoms; Z is a bond, oxygen or sulfur; W is hydrogen, methyl, amino, hydroxy, SO_3H, or $COOR_4$ wherein R_4 is hydrogen of 5-indanyl with the proviso that when Z is oxygen or sulfur, W is other than hydroxy; R_1 is hydrogen or methoxy; R_2 is 1,3,4-thiadiazol-2-ylthio, 5-methyl-1,3,4-thiadiazol-2-ylthio, tetrazol-5-ylthio, 1-methyl-tetrazol-5-ylthio; 1,3,4-oxadiazol-2-ylthio, 5-methyl-1,3,4-oxadiazol-2-ylthio; 1,3,4-triazol-2-ylthio, 5-methyl-1,3,4-triazol-2-ylthio; 1,2,3-triazol-5-ylthio; R_3 is hydrogen, a cation of an alkali metal or an alkaline earth metal, ammonium or organic ammonium cations, a straight or branched lower alkyl group of from 1 to 4 carbon atoms; an alkoxycarbonylaminomethyl group in which the alkoxy moiety is straight or branched and has from 1 to 4 carbon atoms and the amine nitrogen may be substituted with a straight or branched lower alkyl group in which the alkonoyl moiety is straight or branched and has from 2 to 5 carbon atoms; an aminoalkanoyloxymethyl group in which the alkanoyl moiety has from 2 to 15 carbon atoms and the amino nitrogen may be mono- or di-substituted with a straight or branched lower alkyl group having from 1 to 4 carbon atoms; and pharmaceutically acceptable salts and individual optical isomers thereof.

4,124,762

7-[(PYRIDYLTHIOMETHYL)PHENYL]ACETAMIDO-CEPHALOSPORIN DERIVATIVES

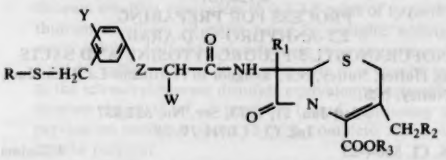
Fortuna Haviv, Wheeling, Ill., and Abraham Patchornik, Ness Ziona, Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed Nov. 7, 1977, Ser. No. 849,019

Int. Cl.[2] C07D *501/24*

U.S. Cl. 544—28 **6 Claims**

1. A compound of the formula



wherein R is 2-pyridyl, 3-pyridyl or 4-pyridyl; Y is hydrogen, chlorine, bromine, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, or an alkoxy group of from 1 to 4 carbon atoms; Z is a bond, oxygen or sulfur; W is hydrogen, methyl, amino, hydroxy, SO_3H, or $COOR_4$ wherein R_4 is hydrogen or 5-indanyl with the proviso that when Z is oxygen or sulfur, W is other than hydroxy; R_1 is hydrogen or methoxy; R_2 is hydrogen or acetoxy; R_3 is hydrogen, a cation of an alkali metal or an alkaline earth metal, ammonium, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, a straight or branched alkanoyloxymethyl group in which the alkanoyl moiety has from 2 to 5 carbon atoms and is straight or branched, an alkanoylaminomethyl group in which the alkanoyl moiety is straight or branched and has from 2 to 5 carbon atoms and the amine nitrogen may be substituted with a straight or branched lower alkyl group having 1 to 4 carbon atoms; an alkoxycarbonylaminomethyl group in which the alkoxy moiety is straight or branched and has from 1 to 4 carbon atoms and the amine nitrogen may be substituted with a straight or branched lower alkyl group of from 1 to 4 carbon atoms, a p-(alkanoyloxy)benzyl group in which the alkanoyl moiety is straight or branched and has from 2 to 5 carbon atoms; an aminoalkanoyloxy methyl group in which the alkanoyl moiety has from 2 to 15 carbon atoms and the amino nitrogen may be mono- or di- substituted with a straight or branched lower alkyl group having from 1 to 4 carbon atoms; and pharmaceutically acceptable salts and individual optical isomers thereof.

4,124,763

FREE RADICAL INITIATORS

Willem J. Mijs, Rozendaal; Charles H. V. Dusseau, Heemstede, and Hermannus J. M. Sinnige, Apeldoorn, all of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

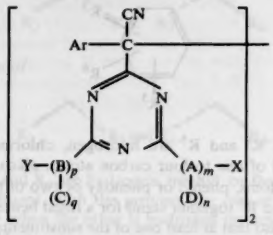
Filed Dec. 10, 1976, Ser. No. 749,502

Claims priority, application Netherlands, Dec. 16, 1975, 7514613

Int. Cl.[2] C07D *251/18, 251/20*

U.S. Cl. 544—219 **4 Claims**

1. A compound having the formula



wherein

m, *n*, *p*, and *q* independently are 0 or 1, provided if $m=0$, then $n=0$; and if $p=0$, then $q=0$;

(2) the groups Y and C, X and D, or both are capable of forming a hetrocyclic ring having 2 to 5 carbon atoms;

(3) X, Y, C, and D are independently selected from the group consisting of substituted and unsubstituted alkyl group having from 1 to about 20 carbon atoms, the substituted alkyl groups being substituted with a substituent selected from the group consisting of fluorine, chlorine, bromine, iodine, alkyl, aryl, alkoxy, alkylthio, carboxylester, cyanol hydroxyl, $-NH_2$, $-COOH$, and $-SO_3H$, alkenyl groups having from about 2 to about 20 carbon atoms, cycloalkyl groups having from 3 to 6 carbon atoms, and phenyl;

(4) if $m=0$, X may also be chlorine;

(5) if $p=0$, Y may also be chlorine;

(6) if $m=1$, X and D independently may also be hydrogen;

(7) $p=1$, Y and C independently may also be hydrogen;

(8) if $m=1$, and $n=1$, A is nitrogen;

(9) if $m=1$ and $n=0$, A is one member selected from the group consisting of oxygen and sulfur;

(10) if $p=1$ and $q=1$, B is nitrogen;

(11) if $p=1$ and $g=0$, B is one member selected from the group consisting of oxygen and sulfur;

(12) and Ar is a substituted or unsubstituted aryl group having from 6 to 30 carbon atoms, the substituted aryl group being substituted with a substituent selected from the group consisting of alkyl having 1 to 4 carbon atoms, aryl, fluorine, chlorine, bromine, iodine, acyl, aroyl, carboxyl, alkoxy, aryloxy, amino, nitro, alkyl sulfonyl, aryl sulfonyl, alkyl sulfinyl, and aryl sulfinyl.

4,124,764

MESO-IONIC DIDEHYDRO DERIVATIVES OF 1,7-DEHYDRO-1-SUBSTITUTED-3H-PYRAZOLO[4,3-E]-1,2,4-TRIAZOLO[4,3-C]PYRIMIDINE-3-THIONES AND 3-ONES

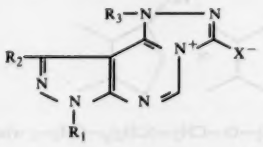
Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 678,832, Apr. 21, 1976, Pat. No. 4,053,474. This application Sep. 13, 1977, Ser. No. 833,103

Int. Cl.[2] **A61K** *31/505*; **C07D** *487/14*

U.S. Cl. 544—251 **12 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, lower alkyl, phenyl-lower alkyl, cyclo-lower alkyl or monohydroxy-lower alkyl;

R_2 is hydrogen or lower alkyl;

R_3 is lower alkyl, cyclo-lower alkyl or monohydroxy-lower alkyl; and

X is sulfur or oxygen.

4,124,765

5-FLUOROURACIL DERIVATIVES

Masayasu Kurono, Osaka; Takeshi Chiba, Takatsuki, and Setsuro Fujii, Tokushima, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 577,085, May 13, 1975, abandoned. This application Sep. 28, 1976, Ser. No. 727,422

Int. Cl.[2] **C07D** *239/54*

U.S. Cl. 544—313 **8 Claims**

2. N^1-ethoxymethyl-5-fluorouracil.

5. N^1-isopropoxymethyl-5-fluorouracil.

8. N^1-cyclopentoxymethyl-5-fluorouracil.

4,124,766

SUBSTITUTED 3-(4-IMIDAZOLYLMETHYLENE)CARBAZIC AND THIOCARBAZIC ACID ESTERS

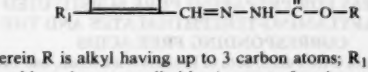
Rolf Paul, River Vale, N.J., and Judith Menschik, Tappan, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 765,317, Feb. 3, 1977, abandoned. This application Nov. 7, 1977, Ser. No. 848,836

Int. Cl.[2] **C07D** *233/64*

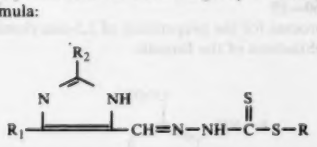
U.S. Cl. 548—337 **10 Claims**

1. A compound selected from the group consisting of those of the formula:



wherein R is alkyl having up to 3 carbon atoms; R_1 is hydrogen, chloro, bromo or alkyl having up to 3 carbon atoms; and R_2 is hydrogen, alkyl having up to 6 carbon atoms, methoxymethyl, phenyl, naphthyl, benzyl, or monosubstituted phenyl, wherein the latter monosubstituted substituent is alkyl (C_1-C_3), alkoxy (C_1-C_3), halo or nitro; and the tautomers thereof.

6. A compound selected from the group consisting of those of the formula:



wherein R is alkyl having up to 3 carbon atoms; R_1 is hydrogen, chloro, bromo or alkyl having up to 3 carbon atoms; and R_2 is hydrogen, alkyl having up to 6 carbon atoms, methoxymethyl, phenyl, naphthyl, benzyl or monosubstituted phenyl, wherein the latter monosubstituted substituent is alkyl (C_1-C_3), alkoxy (C_1-C_3), halo or nitro; and the tautomers thereof.

4,124,767

IMIDAZOLYL-OXIME ETHERS HAVING ANTI-MYCOTIC AND BACTERICIDAL ACTIVITY

Georg Mixich; Kurt Thiele, both of Zofingen, and Johanna Fischer, Reiden, all of Switzerland, assignors to Siegfried A.G., Zofingen, Switzerland

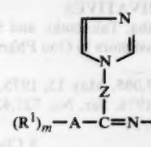
Filed Dec. 27, 1976, Ser. No. 754,691

Claims priority, application Switzerland, Dec. 24, 1975, 16768/75

Int. Cl.[2] C07D *233/60*

U.S. Cl. 548—341 **14 Claims**

1. A compound of the formula (I)



(I)

$$(R^1)_m-A-C(=Z)-N-O-X-(O)_n-B-(R^2)_p$$

in the form of either of its two possible geometric isomers or a mixture thereof in free base form or therapeutically effective salt form as a result of reaction with an acid, in which formula:

Z is selected from the group consisting of straight and branched chain C_1–C_4 alkylene groups,

A is selected from the group consisting of phenyl and naphthyl,

R^1 is selected from the group consisting of halogen, nitro, C_1–C_6 alkyl and C_1–C_6 alkoxy,

X is C_1–C_8 alkylene group,

B is selected from the group consisting of hydrogen, phenyl and naphthyl,

R^2 is selected from the group consisting of halogen, nitro, C_1–C_6 alkyl and C_1–C_6 alkoxy,

m is 0 or an integer of from 1 to 3,

n is 0 or 1, and

p is 0 or an integer of from 1 to 3 but when B is hydrogen both *n* and *p* are 0.

4,124,768

PROCESS FOR PREPARING PURE SUBSTITUTED 2,5-DIARYLAMINO-TEREPHTHALATES AND THE CORRESPONDING FREE ACIDS

Aloys Kirsch; Otto Fuchs, both of Frankfurt am Main, and Ernst Spietschka, Idstein, Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main

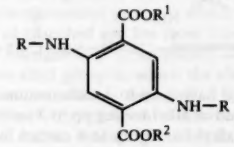
Filed Sep. 22, 1976, Ser. No. 725,501

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1975, 2542494

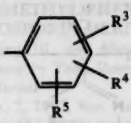
Int. Cl.[2] C07D *101/68*

U.S. Cl. 560—19 **17 Claims**

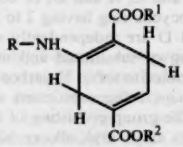
1. In a process for the preparation of 2,5-diarylamino-lower alkyl-terephthalates of the formula



in which R^1 and R^2, which are the same or different, are alkyl of one to 4 carbon atoms and R has the formula



in which R^3, R^4 and R^5 are hydrogen, chlorine, bromine, fluorine, alkyl of one to four carbon atoms, alkoxy of one to four carbon atoms, phenyl or phenoxy or two of the substituents R^3, R^4 and R^5 together stand for a fused benzene nucleus, with the proviso that at least one of the substituents R^3, R^4 and R^5 is not hydrogen, each R having one free ortho-position with respect to the nitrogen atom, by oxidizing a dihydro-2,5-diaryl amino terephthalate of the formula



in which R, R^1 and R^2 are as defined above, with a nitro-aromate in the presence of catalytic amounts of a strong mineral acid or a strong organic acid, the improvement comprising oxidizing said dihydro-2,5-diarylamino terephthalate with a nitro-aromate having the formula

$$R-NO_2$$

in which R is the same as in said dihydro-2,5-diarylamino terephthalate.

4,124,769

5-OXA-13,14-DIDEHYDRO-11-DEOXY-PGF$_{1\alpha}$ COMPOUNDS

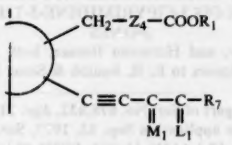
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 657,740, Feb. 13, 1976. This application Aug. 1, 1977, Ser. No. 820,969

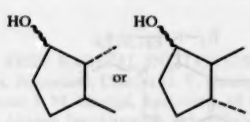
Int. Cl.[2] C07C *177/00*

U.S. Cl. 560—121 **73 Claims**

1. A prostaglandin analog of the formula



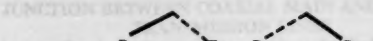
wherein D is



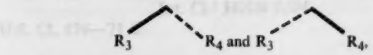
wherein Z_4 is $-CH_2-O-CH_2-(CH_2)_g-CH_2-$; wherein *g* is one, 2, or 3;

wherein R_7 is $-(CH_2)_m-CH_3$, wherein *m* is one to 5, inclusive;

wherein L_1 is

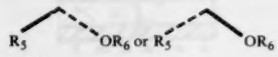


or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;

wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen; and

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,124,770

SEPARATION OF XYLENOLS FROM CRESOLS WITH ADSORBENT

Tetsuya Miyake, Tokyo, and Kunihiko Takeda, Yokohama, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jan. 31, 1977, Ser. No. 764,129

Claims priority, application Japan, Feb. 2, 1976, 51-9297; Feb. 3, 1976, 51-9996

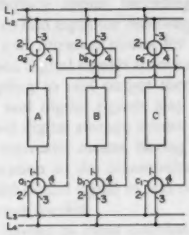
Int. Cl.[2] C07C *37/24*

U.S. Cl. 568—758 **8 Claims**

1. A process for separating xylenols from cresols, comprising the following steps:

(a) feeding a mixture of xylenols and cresols to a column containing a zeolite having apertures of from 5.5 to 15 Å and containing at least one cation selected from the group consisting of lithium, potassium, cesium, rubidium, calcium, barium, strontium cadmium, chromium, molybdenum, manganese, iron, nickel, cobalt and ammonium,

(b) feeding a development agent through said column at a temperature from 20° to 320° C. under a pressure from atmospheric to 50 ata., thereby preferentially to dislodge xylenol molecules from the column whereby the concentration of xylenols is increased in the development agent first coming through said column and the concentration of cresols is increased in the development agent later coming through said column, said development agent



being selected from the group consisting of ethanol, n-propyl alcohol, n-butyl alcohol, iso-butyl alcohol, sec-butyl alcohol, n-amyl alcohol, n-octanol, cyclohexanol, acetone, methylethylketone, diethylketone, acetophenone, cyclohexanone, propionitrile, butyronitrile, 1-nitropropane, ethylenediamine, methylenechloride and dimethylsulfone, and

(c) recovering a fraction of development agent enriched in xylenols from the effluent from the column.

4,124,771

8-ALLYL-8-HYDROXYTRICYCLO-[5,2,1,$0^{2,6}$] DECANE

Harmannus Boelens, Huizen, and Hendrik J. Wobben, Naarden, both of Netherlands, assignors to Naarden International, N.V., Naarden-Bussum, Netherlands

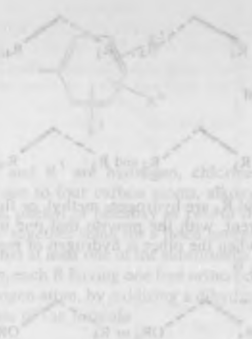
Division of Ser. No. 635,213, Nov. 25, 1975, Pat. No. 4,057,516. This application Aug. 22, 1977, Ser. No. 826,768

Claims priority, application Netherlands, Nov. 27, 1974, 7415485

Int. Cl.[2] C07C *35/22*

U.S. Cl. 568—817 **1 Claim**

1. 8-Allyl-8-hydroxytricyclo (5,2,1,$0^{2,6}$) decane.

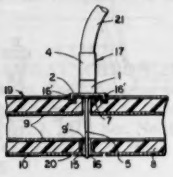


4,124,772

JUNCTION BETWEEN COAXIAL MAIN AND BRANCH TRANSMISSION LINES

Andrea Baggiani, Como, Italy, assignor to Societa Italiana Telecomunicazioni Siemens S.P.A., Milan, Italy

Filed Sep. 2, 1977, Ser. No. 830,332
Claims priority, application Italy, Sep. 3, 1976, 26830 A/76
Int. Cl.[2] H01B *9/04*
U.S. Cl. 174—71 C **6 Claims**



1. In a telecommunication system including a main transmission line conductively connected to a coaxial branch line, said main line comprising a dielectric tube provided with an inner metallic layer and an outer metallic layer, said branch line including an inner conductor and an outer conductor,

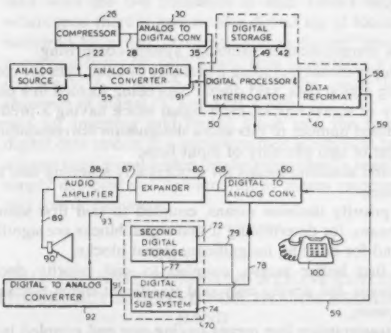
the improvement wherein said branch line is provided with a conductive sleeve forming an extension of said outer conductor and with a conductive pin forming an extension of said inner conductor, said pin projecting beyond said sleeve by a distance at least equal to the diameter of said tube, said pin penetrating a transverse perforation of said tube constituted by a first bore proximal to said sleeve and a second bore remote from said sleeve, the wall of said second bore being provided with a metallic coating which is electrically continuous with said inner layer and terminates in a matallic patch on the outer surface of said tube within a discontinuity of said outer layer, said sleeve being soldered to said outer layer in a region surrounding said first bore, said pin being soldered to said patch at the outer end of said second bore.

4,124,773

AUDIO STORAGE AND DISTRIBUTION SYSTEM

Robin Elkins, 5641 NW. 28th St., Lauderhill, Fla. 33313

Filed Nov. 26, 1976, Ser. No. 744,966
Int. Cl.[2] H04M *11/00*
U.S. Cl. 179—2 A **12 Claims**



1. An audio communications system for transmitting analog signals over a communications circuit, said system comprising in combination:

compressor means for receiving the analog signal at an input thereof and compressing the waveform amplitude of the analog signal in a predetermined manner for generating a compressed analog signal at an output thereof;

analog to digital converter means, having an input coupled to said output of said compressor means, for converting said compressed analog signal to a digital signal at an output thereof;

digital interface means, having a first input coupled to said output of said analog to digital converter means, for storing and selectively transmitting said digital signals to an output thereof coupled to the communications circuit, said digital interface means including digital storage means coupled to said input for receiving and storing said digital signals, and retrieval means for recovering a selected one of said digital signals from said digital storage means for coupling to said output thereof, whereby selected ones of said digital signals may be randomly retrieved from said digital storage means;

digital to analog converter means, having an input coupled at a remote location to the communications circuit, for reconverting said digital signal to said compressed analog signal at an output thereof;

expander means, having an input coupled to said output of said digital to analog converter means, for expanding the waveform amplitude of said compressed analog signal in a predetermined manner for reconstructing the analog signal;

means for transmitting a selector signal to said retrieval means from said remote location over said communication circuit; and

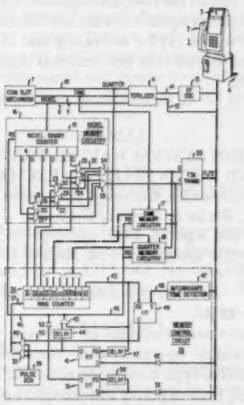
means for decoding said selector signal for designating a selected digital signal to be retrieved.

4,124,774

TELEPHONE STATION COIN MEMORY AND CONTROL SYSTEM

Alfred Zarouni, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 27, 1977, Ser. No. 819,244
Int. Cl.[2] H04M *17/00*
U.S. Cl. 179—6.3 R **31 Claims**



27. A coin telephone station arrangement

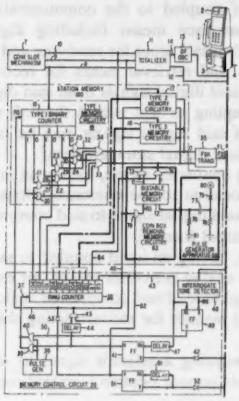
comprising individual memory means for respectively storing signals representing the numbers of different value coins deposited in the coin telephone station and

means for sequentially interrogating said memory means responsive to signals from a central office and for transmitting to the office indications of the stored signals in said memory means.

4,124,775
COIN BOX REMOVAL INFORMATION PROCESSING ARRANGEMENT

Alfred Zarouni, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 9, 1978, Ser. No. 868,042
Int. Cl.[2] H04M *17/00*
U.S. Cl. 179—6.3 R **17 Claims**



1. A coin box removal information processing arrangement for a coin telephone station (1) having

a coin box (3) for storing deposited coins,

a station memory (100) for registering data signals for said coin telephone station and

a memory control circuit (26) responsive to a receipt of a control signal for examining said memory (100) to read out the registered data signals,

characterized in that

said memory (100) comprises

circuitry (83, 88) responsive to a removal of said coin box (3) from said station (1) for storing a coin box removal signal, and

said control circuit (26) includes apparatus (87) responsive to an interrogation signal from the central office during a call from said station (1) for activating said circuitry for reading out the stored coin box removal signal from said circuitry (83).

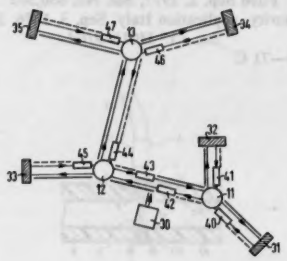
4,124,776
INFORMATION SYSTEM HAVING MULTIPLE ACCESS AND DECENTRALIZED EXCHANGE

Rudolf Nocker, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 28, 1977, Ser. No. 791,716
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1976, 2619391
Int. Cl.[2] H04J *6/00*
U.S. Cl. 179—15 AL **24 Claims**

1. In an information system of the type having multiple access and which operates with decentralized exchange switching in a tree-type conductor network, and which comprises branches, branch points and stations, each station having a unique address which is included in a call signal to that station, each branch including two paths of mutually opposite transmission directions and all paths of the network having the same number of transmission channels, each channel of a path being associated with a channel of the other path to form a channel pair, and each channel pair of a branch being clearly and oppositely associated with a channel pair of each adjacent branch in the network to form a channel pair tree, and in which each station is connected to both paths of a branch to receive calls, busy signals, free signals, other signaling signals and useful signals, the improvement comprising:

monitoring means in each of the stations for monitoring all channels upon both paths,



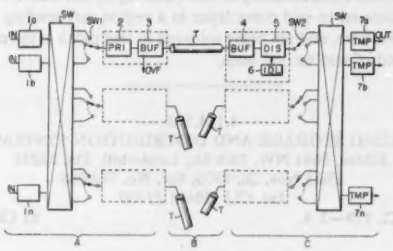
detecting means for detecting busy signals on the channels and indicating that a channel pair is busy in response to detection of a busy signal on either channel of the channel pair, and

means for providing that only one channel pair tree is busy for the transmission of signals between two stations.

4,124,777
SIGNAL EXCHANGE SYSTEM IN AN INTEGRATED SERVICES DIGITAL NETWORK

Hiromichi Mori, Kawasaki, and Yoshikazu Ikeda, Tama, both of Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1977, Ser. No. 826,963
Claims priority, application Japan, Aug. 24, 1976, 51-100149
Int. Cl.[2] H04J *3/16*
U.S. Cl. 179—15 AS **6 Claims**



1. A communication exchange system comprising:

(a) input means including a plurality of input lines for receiving digital data, said digital data being formed in a plurality of signal blocks, each signal block having a predetermined number of bits and a designation corresponding to one of said plurality of input lines;

(b) first scanning means for sequentially scanning said input lines;

(c) priority decision means, coupled to said first scanning means, for determining if said signal blocks are significant and for deleting insignificant signal blocks;

(d) first buffer means, coupled to said priority decision means, for storing only said significant signal blocks in a queue;

(e) transmission line means having one end coupled to said first buffer means;

(f) second buffer means coupled to the other end of said transmission line means for receiving the queue of significant signal blocks;

(g) distribution circuit means coupled to said second buffer means;

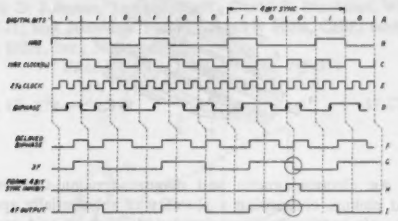
(h) idler means coupled to said distribution circuit means for inserting into the queue of signal blocks idle signals corresponding to said insignificant signal blocks;
(i) second scanning means coupled to said distribution circuit means; and
(j) output means coupled to said second scanning means, said distribution circuit means distributing said signal blocks to said output means through said second scanning means in accordance with the designation in said signal blocks.

4,124,778

DIGITAL FRAME SYNCHRONIZING CIRCUIT

Peter Amass, Camarillo, Calif., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Nov. 2, 1977, Ser. No. 847,924
Int. Cl.[2] H04J 3/06; H04L 7/08
U.S. Cl. 179—15 BS **5 Claims**



1. In a digital information processing system in which digital information is formatted in a 3F delay modulation (Miller) code in which digital "1"s are represented as transitions at a particular location such as at the center of a bit cell and "0"s are represented as the absence of transitions at that location and by a transition at the start of a bit cell if the preceding bit was also a "0", such that allowable transitions occur at intervals corresponding to the durations of two bit cells, one and one-half bit cells and one bit cell respectively, thereby creating three respective frequencies f_o, $1\frac{1}{2}$ f_o and $2f_o$, and wherein a plurality of digital bits are serially combined to form a digital word and a plurality of words are serially combined to form a succession of frames making up a stream of digital bits, at least one word of each frame being dedicated to providing a frame sync code,

a frame synchronizing circuit comprising

means for generating a digital signal consisting of a sequence of digital bits 1-0-0-1 and for inhibiting a transition associated with the 0-0 transition in said 1-0-0-1 sequence, whereupon there is generated a digital signal block characterized by a pair of previously unallowed transitions occurring three bit cells apart, thus generating a fourth frequency, $f_1/2$ which cannot naturally occur by any sequence of digital "1"s and "0"s, and

means for inserting said digital block into the formatted digital data stream at a predetermined location to provide a frame sync signal which can be subsequently readily and simply detected and operated on by means responsive to said fourth frequency.

4,124,779

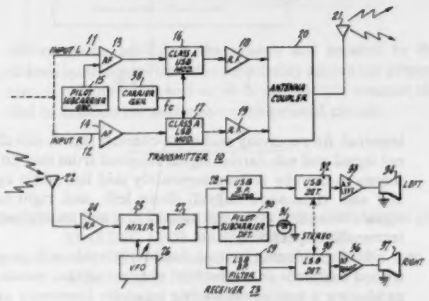
DUAL CHANNEL COMMUNICATIONS SYSTEM PARTICULARLY ADAPTED FOR THE AM BROADCAST BAND

Stephen Berens, Stone House Rd., Somers, N.Y. 10589, and Jack Berens, 217-20 130th Ave., Laurelton, N.Y. 11413

Filed Sep. 12, 1977, Ser. No. 832,219
Int. Cl.[2] H04H 5/00
U.S. Cl. 179—15 BT **3 Claims**

1. A communications system particularly adapted for transmitting a first and a second signal, each indicative of separate information content wherein the frequency bandwidth of said information is relatively equal, comprising:

(a) a first source of signals manifesting first information content within a predetermined band of frequencies,
(b) a second source of signals manifesting second information content, within the same band of frequencies,
(c) a carrier frequency source for providing at an output, a reference frequency different from any component contained in said predetermined band,
(d) first Class A modulating means responsive to said first signal and said carrier frequency to provide at an output, a first modulated signal having frequency components above said carrier frequency,
(e) second Class A modulating means responsive to said second signal and said carrier frequency to provide at an output, a second modulated signal having frequency components below said carrier frequency,



(f) means for combining said first and second modulated signals to provide a composite signal and means responsive to said composite signal for propagating the same over a transmission path,
(g) means coupled to said first source of signals for adding a pilot subcarrier signal thereto indicative of the transmission of said first and second sources of signals,
(h) receiver means responsive to said signal as propagated, said receiver including processing means for retreiving said first and second signals from said composite signal, said receiver means further including detector means responsive to only said composite signal for retreiving said pilot subcarrier signal and means coupled to said detector means for providing an indication of the presence of said pilot signal.

4,124,780

FM STEREOPHONIC RECEIVER PROVIDING A TEST SIGNAL

Minoru Ogita, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Nov. 3, 1977, Ser. No. 848,529
Claims priority, application Japan, Nov. 18, 1976, 51-154799[U]
Int. Cl.[2] H04H 5/00
U.S. Cl. 179—15 BT **10 Claims**

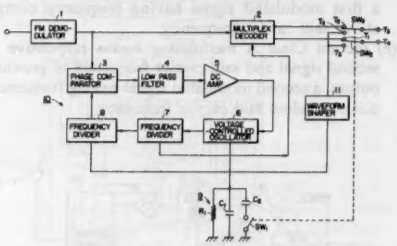
1. An FM stereophonic receiver for receiving an FM stereophonic broadcast signal and thereby for restoring a left- and a right-audio signal produced at a broadcast station transmitting the FM stereophonic braodcast signal, including:

an FM demodulator for demodulating the receiver FM stereophonic broadcast signal to thereby produce a composite signal consisting of a main-channel signal, a subchannel signal and a pilot signal;

a phase-locked loop circuitry for regenerating a subcarrier signal used at said broadcast station to produce said subchannel signal, comprising a voltage-controlled oscillator whole oscillating frequency is controllable in accordance

with a control voltage applied thereto, a phase comparing circuit for generating said control voltage having a value and a polarity both being associated with a difference in the phase between said pilot signal and a comparison signal of which frequency and phase both being associated with those of an output signal of said voltage-controlled oscillator, circuit means coupled to said voltage-controlled oscillator for producing said comparison signal and said sub-carrier signal;

a multiplex decoder, having a first and a second output



terminal, for receiving said main-channel signal, sub-channel signal and sub-carrier signal supplied from said circuit means to thereby restore separately said left-audio signal and said right-audio signal, these left- and right-audio signals being delivered out on said first and second output terminals, respectively; and

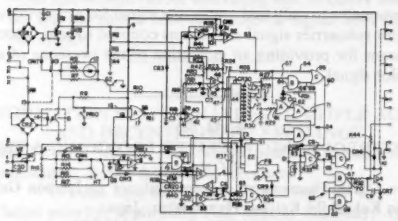
test signal producing means including said voltage-controlled oscillator as an essential element of said means, for producing a test signal having an audio frequency and a constant amplitude, said test signal being delivered out at a third output terminal.

4,124,781

TELEPHONE TOLL RESTRICTOR

Regis B. Mellon, St. Petersburg, Fla., assignor to Akzona Incorporated, Asheville, N.C.

Filed Aug. 31, 1977, Ser. No. 829,557
Int. Cl.[2] H04M *1/66*
U.S. Cl. 179—90 D **7 Claims**



1. A circuit adapted to be connected to the conductors of a telephone line comprising:

first and second input terminals adapted to be connected respectively to first and second telephone line conductors;

voltage sensing means adapted to be connected to said first and second input terminals and thus across the first and second conductors;

said voltage sensing means including an output means; said output means providing an indication of certain predetermined voltage levels across said first and second input terminals;

switch means connected between said voltage sensing means and said first input terminal;

current sensing means connected in series with one of the conductors;

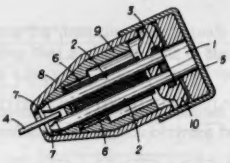
circuit means responsive to a first condition of said current sensing means for opening said switch means and responsive to a second condition for closing said switch means, whereby said voltage sensing means will exhibit substantially infinite input impedance to said telephone line during said first condition.

4,124,782

SOUND PICKUP HAVING PLASTIC ENVELOPED POLE PLATE TO POLE ROD JUNCTION

Manfred Schön, Vienna, Australia, assignor to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H., Australia

Filed Jul. 27, 1976, Ser. No. 709,074
Claims priority, application Australia, Jul. 29, 1975, 5869/75
Int. Cl.[2] H04R *11/12*
U.S. Cl. 179—100.41 K **4 Claims**



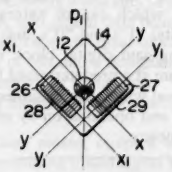
1. An electromagnetic and magnetodynamic-transducer-sound pickup, comprising a plurality of substantially spaced apart pole rods, a coil associated with each of said rods, a common pole plate connected to the ends of said rods, a phonograph needle, a magnetic member connected to said phonograph needle and being oscillatable thereby and being disposed adjacent said rods, and an envelope of injection molded thermoplastic firmly adhering to said pole rods and said pole plate at the junctures thereof and embedding said pole rods and said pole plate within the thermoplastic, said envelope being injection molded only substantially in the immediate vicinity of said junctures and firmly adhered to said junctures after said pole rods and said plate are in place whereby the natural resonance of said pole rods is dampened to smooth the frequency characteristic of the pickup.

4,124,783

PHONOGRAPHIC PICKUP

Mitsuo Nemoto, Machida, Japan, assignor to Kabushiki Kaisha Audio-Technica, Tokyo, Japan

Filed Mar. 31, 1977, Ser. No. 783,403
Claims priority, application Japan, Dec. 21, 1976, 51-154458
Int. Cl.[2] H04R *9/16*
U.S. Cl. 179—100.41 K **5 Claims**



1. A phonograph pickup comprising a body including a permanent magnet having a pair of pole pieces which define a magnetic gap therebetween; and a stylus assembly including a pair of columnar armatures of a magnetic material which are positioned within the magnetic gap, the stylus assembly comprising a cantilever arm having a stylus tip at its one end, a carrier of a non-magnetic material secured to the other end of the arm and carrying the pair of armatures thereon, and support means for mounting the carrier together with the arm on the body in a manner to permit an oscillation thereof, said

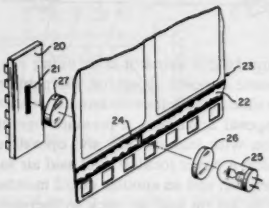
armatures being located on the opposite sides of a first imaginary vertical plane inlcuding the axis of the arm and lying on a second imaginary vertical plane which is perpendicular to the first vertical plane, the armatures having axes which are respectively parallel to and spaced apart from the modulation axes of a sound groove of a record disk said modulation axes being projected onto the second vertical plane in a manner to intersect with the axis of the arm, the pair of pole pices being located on the opposite sides of the second vertical plane so that a flux therefrom passes through the magnetic gap substantially perpendicular to the second vertical plane, the stylus assembly also comprising a pair of independent coils disposed on the pair of armatures and thus carried by the carrier, the coils having lead wires which are connected with output terminals provided on the body.

4,124,784

MOTION PICTURE SOUND SYSTEM

Keith O. Johnson, Tarzana, Calif.; David E. Blackmer, Wilton, N.H., and John deS. Mosely, Beverly Hills, Calif., assignors to DBX, Inc., Newton, Mass.

Filed May 23, 1977, Ser. No. 799,573
Int. Cl.[2] G11B *7/00*; G03B *31/02*
U.S. Cl. 179—100.3 R **17 Claims**



1. A system for reproducing sound from audio signals optically recorded such that the audio information is embodied in variations of the positions of a boundary on the optical record, said system comprising:

means for detecting the position of said boundary and for providing a sequence of electrical signal transitions, the phase of each of which is representative of correspondingly successive variations in said position of said boundary, and

means for converting said sequence of signal transition into sound.

4,124,785

TELEPHONE SET

Stanley E. Seretny, and Carl E. Webb, both of Indianapolis, Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation of Ser. No. 660,324, Feb. 23, 1976. This application Feb. 14, 1978, Ser. No. 877,597
Int. Cl.[2] H04M *1/03, 1/23*
U.S. Cl. 179—103 **5 Claims**

5. A dial-in-handset telephone comprising:

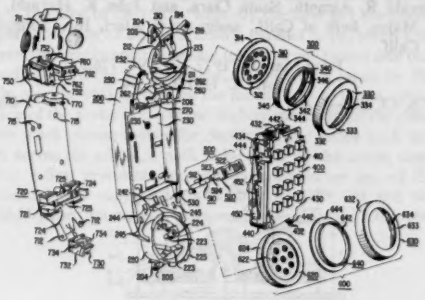
a unitary rigid chassis including transducer-receiving cup portions at the extremities thereof and a dial-receiving cavity in the middle thereof, the transducer-receiving cup portions and the dial-receiving cavity all being open to a first side of the chassis;

a housing enclosing the chassis;

means for respectively mounting a transmitter and a receiver in the transducer-receiving cup portions independent of the housing;

a flexible printed circuit extending along the second side of the chassis, the printed circuit having a plurality of components joined thereto and electrically connected to conductive paths thereon, several of the components being supported on the chassis and the supported components all being detachably mounted on the chassis whereby the printed circuit is readily separable from the chassis; and

a dial separate from the printed circuit positioned within the



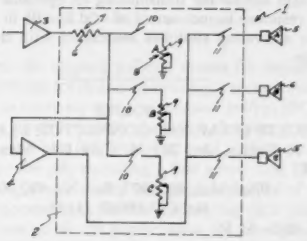
dial-receiving cavity of the chassis and secured to the chassis by fasteners that also detachably secure the printed circuit to the chassis and serve to electrically connect the dial to conductive surfaces on the printed circuit.

4,124,786

SPEAKER COMPARATOR DEVICES AND METHODS OF MAKING AND USING THE SAME

John C. Kircher, 9929 Norwick, St. Louis, Mo. 63137

Filed Jan. 21, 1977, Ser. No. 761,204
Int. Cl.[2] H04R *29/00*
U.S. Cl. 179—175.1 A **8 Claims**



1. A speaker comparator to allow performance comparison of various speakers utilizing the same input and at the same volume level in a system or equipment provided with preamplifying gain stage and an amplifying gain stage comprising,

- housing means,

a plurality of speaker connection terminals operably mounted to said housing means,

- a plurality of attenuators operably mounted to said housing means,

-first switching means operably mounted on said housing means and electrically disposed so as to selectively connect a particular attenuator to the input of said amplifying stage,

- an impedance matching means operably mounted to said housing means and disposed between said preamplifying and amplifying gain stages, and electrically connected to the output of said preamplifier and to said first switching means,

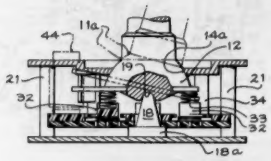
- second switching means operably mounted on said housing means and electrically disposed so as to selectively connect a particular speaker terminal to the output of the amplifying gain stage.

4,124,787

JOYSTICK CONTROLLER MECHANISM OPERATING ONE OR PLURAL SWITCHES SEQUENTIALLY OR SIMULTANEOUSLY

Gerald R. Aamoth, Santa Clara, and John K. Hayashi, San Mateo, both of Calif., assignors to Atari, Inc., Sunnyvale, Calif.

Filed Mar. 11, 1977, Ser. No. 776,527
Int. Cl.[2] H01H *25/04*
U.S. Cl. 200—6 A **5 Claims**



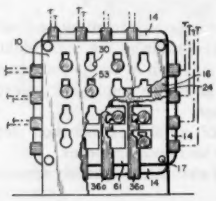
1. A controller assembly for generating switch closures in response to X-Y manual movements, said assembly comprising an elongate handle, means supporting said handle for movement in an arc in directions radially of the axis of said handle, a substrate lying in a plane extending transversely of said axis, a plurality of pressure-activated switches carried on said substrate and disposed in a predetermined pattern about said axis, means disposing a plurality of operating arms in a plane closely spaced to the plane of said substrate, each of said operating arms being movable into and out of pressure activating relation with respect to an associated one of said switches, and means enabling said handle to be moved to apply a force selectively to one or more of said arms at a given time to selectively operate one or more of said switches singly or simultaneously, the last named means including spring means carried by a lower extension of said handle for transmitting an operable force to said arms in response to movement of said handle in related directions for activating switches associated with the last named said arms.

4,124,788

MULTI-TERMINAL CONNECTOR ELEMENT

Harold F. Kedian, Jr., 267 N. Gate Rd., Manchester, N.H. 03104

Filed Mar. 28, 1977, Ser. No. 782,003
Int. Cl.[2] H01R *13/70*
U.S. Cl. 200—51 R **23 Claims**



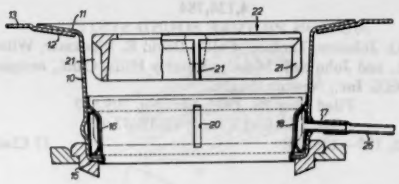
1. A multi-terminal connector structure comprised of nonconductive material containing spaced parallel lines of spaced parallel passages open at one end, two at least arrays of spaced parallel conductors situated in planes perpendicular to the axes of the passages in axially spaced parallel relation, with the conductors in adjacent arrays at right angles to each other, with the ends of the conductors extending from all four sides of the structure for attachment of conductor wires thereto, if required due to individual design requirements, and with portions of the conductors in each array extending into said passages, nonconductive wiper carriers adapted to be inserted into said passages through the open ends and rotated therein, conductive wiper elements extending radially from said carriers at an axial spacing corresponding to the axial distance between adjacent arrays of conductors adapted to be simultaneously engaged with said portions of the conductors extending into said passages and conductor means within the carriers connecting the wiper elements in each carrier to each other.

4,124,789

PRESSURE SWITCH ACTUATOR

Graham M. Preece, Checkley, England, assignor to The Haigh Engineering Company Limited, Ross-on-Wye, England

Filed Apr. 12, 1977, Ser. No. 786,871
Claims priority, application United Kingdom, Apr. 27, 1976, 16988/76
Int. Cl.[2] H01H *35/30*
U.S. Cl. 200—81 R **3 Claims**



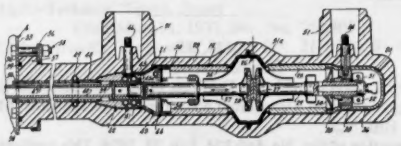
1. A pressure switch actuator controlling energization of a motor in a waste disposal apparatus, the actuator comprising an annular flexible air sack located around an access opening to the waste disposal apparatus, a pressure operated switch in communication with said air sack and operatively associated with said motor, a cover located over said air sack to provide protection therefor, and an annular guard member locatable in said opening to act on said air sack to increase the pressure therein and thereby actuate said switch.

4,124,790

PROTECTIVE SWITCH DEVICE AND OPERATING MECHANISM THEREFOR

David G. Kumbera, Greendale, and John A. Bordak, Milwaukee, both of Wis., assignors to McGraw-Edison Company, Milwaukee, Wis.

Filed Mar. 6, 1975, Ser. No. 555,948
Int. Cl.[2] H01H *33/66*
U.S. Cl. 200—144 B **14 Claims**



1. In a protective switch device for rapid opening and closing of a power circuit, the combination comprising an encapsulated interrupter including a first and a second contact within a vacuum enclosure, the first of said contacts being movable relative to said second contact and including an operating member extending from said vacuum enclosure, an outer solid insulation wall encapsulating said enclosure with said enclosure embedded in said insulation wall, said insulation wall including a mounting wall and having an opening extending inwardly from said mounting wall to said enclosure, said operating member extending through said opening, said insulation wall having a high mechanical strength to form a supporting structure,

a separate housing having a coupling opening, said mounting wall being an integral mounting enlargement portion of the insulation wall, attachment means including a clamping element secured to the housing and releasably abutting

the exterior of said enlargement portion and drawing the mounting wall into tight abutting supporting engagement with said housing with said operating member extending through said opening to attach the encapsulated interrupter to the housing, and

an operating mechanism mounted within said housing, said operating mechanism including yieldable resilient means urging the mechanism to a collapsed position and having releasable latch means holding the mechanism in an extended position, said mechanism being coupled to said operating member for rapid movement of the movable contact in response to release of said latch means.

4,124,791

ELECTRICAL SWITCH

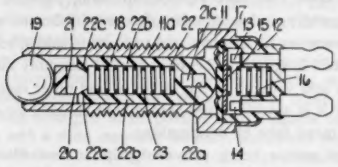
Keith Lewis, Burnley, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Apr. 5, 1977, Ser. No. 784,859

Claims priority, application United Kingdom, Apr. 14, 1976, 15185/76

Int. Cl.[2] H01H *3/12*

U.S. Cl. 200—159 R **7 Claims**



1. "An electrical switch including a hollow body, electrical contacts carried by the body, and an operating member slidable in the body whereby the contacts are operated, said operating member comprising first and second identical parts, said first and second parts being inter-engaged, the first part having components which engage as a snap-fit with the second part, and the second part similarly having components which engage the first part as a snap-fit, the inter-engagement of the first and second parts permitting limited relative movement of the parts in the direction of movement of the operating member relative to the body, and, resilient means urging the first and second parts apart in the direction of movement of the operating member, whereby during initial movement of the operating member from a rest position the first and second part of the operating member move in unison, and the contacts of the switch are operated, while during further movement of the operating member relative to the body of the switch after operation of the contacts the first operating member part is moved relative to the second operating member part against the action of said resilient means."

4,124,792

EDDY CURRENT PROBE SUBSYSTEM

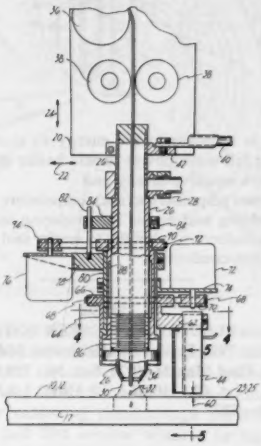
John H. Flora, Lynchburg, Va., and Nuri Akgerman, Columbus, Ohio, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 25, 1977, Ser. No. 818,631

Int. Cl.[2] B23K *9/00*

U.S. Cl. 219—124.34 **1 Claim**

1. In a machine for arc welding magnetically permeable work pieces, comprising a tubular torch powered for movement over and along a gap-type joint defined by two laterally spaced work pieces, and a consummable wire electrode feedable axially through the torch for fusion and deposition in the defined joint: the improvement comprising means for generating electric signals representing the position of the torch relative to the gap-type joint, said signal-generating means including a sleeve (**88**) encircling the torch; said torch and sleeve having meshed threads (at **86**) whereby the sleeve is adjustable in the direction of the torch axis; a tube (**80**) freely encircling said sleeve so that the sleeve can turn on the torch without transmitting a rotary force to the tube; two motor-support arms (**74** and **78**) affixed to said tube; key means (at **82**, **84**) for keying the tube to the torch, whereby the tube and associated support arms can be adjusted axially parallel to the torch axis; a barrel (**64**) freely encircling said tube; a probe mount arm (**62**) extending from the barrel in the advance path taken by the torch; a probe (**44**) carried by the mount arm so that a sensor surface of the probe is in a plane slightly spaced from the plane of the work pieces; means for oscillating the probe back and forth across the advance path to be taken by the torch, comprising a first reversible motor (**72**) mounted on one of the aforementioned support arms, aligned pulleys (**70** and **66**) carried by the first motor's shaft and barrel (**64**), and a belt (**68**)



trained around the aligned pulleys; means for adjusting the probe parallel to the torch axis comprising a second motor (**76**) mounted on the other support arm, aligned pulleys (**94** and **90**) carried by the second motor's shaft and aforementioned tube (**88**), and a second belt (**92**) trained around the last-mentioned pulleys; said probe (**44**) including a first sensor coil (**50**) energized by an A.C. source so that an impedance signal of varying intensity is generated in the sensor coil during each oscillatory pass of the probe across the gap between the work pieces, and a second compensator coil (**52**) located approximately the same distance from the torch as the first coil so that each coil is similarly influenced by magnetic fields generated by the torch arc; said compensator coil being oriented within the probe so that it is substantially further away from the work pieces than the sensor coil.

4,124,793

AQUARIUM WATER HEATER

Robert Colman, New York, N.Y., assignor to Metaframe Corporation, Elmwood Park, N.J.

Filed Jan. 13, 1978, Ser. No. 869,123

Int. Cl.[2] H05B *3/80*

U.S. Cl. 219—523 **11 Claims**

1. In an aquarium water heater adapted to be energized from an alternating current source, said aquarium water heater having a heath conductive tube for receiving components therein, the combination comprising:

an electrical heater element;

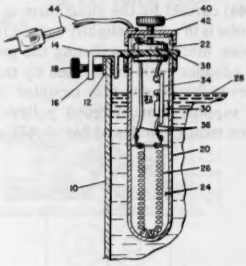
first and second controllable rectifier means connected in parallel and opposing conductive relation with each other and in series with said heater element;

means responsive to application of alternating current power for rendering said first rectifier means conductive to per-

mit the flow of current therethrough and through said heater element during one-half the cycle of the alternating current power source;

means responsive to the conduction of said first rectifier means for storing electrical energy;

means for rendering said second rectifier means conductive on the other half cycle of said alternating current power



source in response to the energy so stored whereby to provide full wave power to said heater element;

temperature sensitive means; and

circuit means responsive to said temperature sensitive means for disabling said means for rendering said first rectifier means conductive, whereby to render said second rectifier means non-conductive.

4,124,794

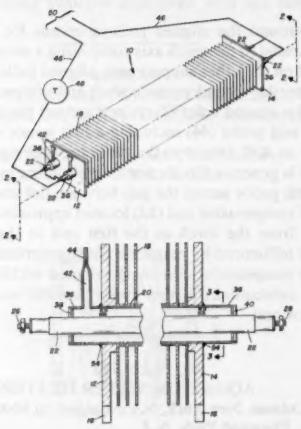
ELECTRICAL HEATER UNIT

Emil W. Eder, 7912 E. 31st St., Baltimore, Md. 21237

Filed May 24, 1977, Ser. No. 799,992

Int. Cl.[2] H05B *3/50*; H01C *1/026*

U.S. Cl. 219—530 **2 Claims**



1. A space heating structure comprising:

a heat source means consisting of a longitudinally arranged heating element assembly with an electrical terminal at each end by which said longitudinal heating element assembly is connected by electrical wires to an electrical energy source;

said heat source including an outer metal tube encasing said longitudinal heating element assembly, said outer metal tube being cylindrical and of a shorter length than said longitudinal heating element assembly, said longitudinal heating element assembly being centrally located within said outer metal tube in spaced relation thereto with said electrical terminals and the ends of said longitudinal heating element assembly extending from the ends of said outer metal tube, the ends of said outer metal tube being closed by cylindrical metal plates located within the ends of said cylindrical outer metal tube, the ends of said longitudinal heating element assembly with said electrical terminals thereon passing through centrally located openings in said cylindrical metal plates said cylindrical metal plates each being permanently sealed around the outer periphery thereof at the interface with said outer metal tube and each permanently sealed around the periphery of said longitudinal heating element assembly where said cylindrical metal plates and said longitudinal heating element assembly interface thereat, the sealing of said cylindrical metal plates establishing a sealed space between said outer metallic tube and said heating element assembly, said space being evacuated;

a tube connection to said sealed space, said tube connection communicating with interior of the sealed space, said tube being used to evacuate said sealed space to establish a vacuum therein, said vacuum surrounding said longitudinal heating element assembly enclosed within said outer metal tube, said tube connection being pinched off to permanently seal said tube after establishment of said vacuum so as to maintain said vacuum in said space, heat from said longitudinal heating element assembly radiating across said vacuum to the inside of said outer metal tube where it is absorbed and transmitted to exterior of said outer metal tube by conduction;

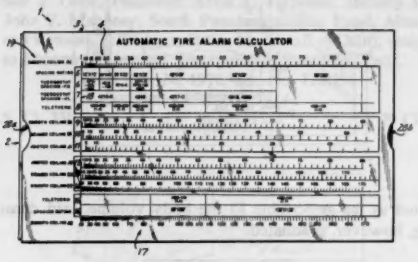
said heat source being provided with a heat dissipating means consisting of a plurality of spaced rectangular metal fins, said metal fins being set upon the periphery of the exterior of said outer metal tube, the outer metal tube passing through an opening in each of said metal fins, each of said metal fins having a collar-like spacer lip surrounding said opening said spacer lip being on one side only of said metal fin and perpendicular to plane of the face of said metal fin and attached thereto as a continuation of said metal fin, heat conducted to exterior of said sealed outer metal tube being further conducted into and through said metal fins and dissipated to surrounding space by convection; and

said heat source being provided with support means comprising a pair of rectangular metal end plates, one affixed to each end of said outer metal tube, said outer metal tube passing through an opening in each of said metal end plates, each of said metal end plates having a collar-like spacer lip surrounding said opening therein, said spacer lip being on one side only of said metal end plate and perpendicular to plane of face of said metal end plate and attached thereto as a continuation of said metal end plate, said metal end plates being so mounted on said outer metal tube so that said spacer lips on said metal end plates are inwardly directed so as to contain said metal fins between them in a closely packed arrangement, said connection tube being located between the end of said outer tube and the other side of one of said end plates, said metal end plates being permanently affixed in the position where said metal fins between said metal end plates are centrally located along the longitudinal length of said outer metal tube, each of said rectangular metal end plates having a rectangularly shaped recess out from lower side thereof to form two legs downwardly extending on which said space heating structure will stand, said legs being opposite to side of sealed outer metal tube from which said tube connection extends.

4,124,795
FIRE PROTECTION CALCULATOR

Joseph LiCalsi, East Meadow, N.Y., assignor to American District Telegraph Company, Jersey City, N.J.

Filed Sep. 27, 1976, Ser. No. 726,849
Int. Cl.[2] G06G 1/02; G06C 3/00
U.S. Cl. 235—70 A 4 Claims



1. A calculator for selecting appropriate spot-type fire protective devices for a space division of predetermined dimension and ceiling type comprising: a body member carrying two logarithmic scales extending therealong, one of said scales being an expansion of the lower end of the second of said scales, and an index line located at the zero positions of said scales, the interlineations of said scales representing one dimension of said space division and the spacing of these interlineations being arranged in proportion to the square of said dimension; and a slide member, slidably positioned within said body member and carrying two sets of scales extending therealong, one set being an expansion of the lower portion of the second set, each set comprising three logarithmic scales and at least one fire detector scale established with reference to standard space detector ratings, one of said logarithmic scales corresponding to each of ceiling types smooth, beamed and joisted, the interlineations of said logarithmic scales representing the other dimension of said space division and the spacing of these interlineations being arranged in proportion to the square of the dimension as derated by that derating factor appropriate for said ceiling type, the dimension of the space division represented by the interlineations of the slide member logarithmic scales corresponding to ceiling types beamed and joisted being the dimension of the space division perpendicular to the beams and joists respectively of said ceiling types.

4,124,796
EMISSION CONTROL CALCULATOR

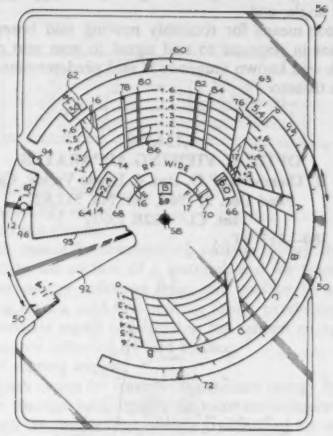
Marvin W. Shores, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Dec. 15, 1976, Ser. No. 750,747
Int. Cl.[2] G06C 3/00, 1/02, 27/00
U.S. Cl. 235—88 R 4 Claims

1. A calculator for displaying a receiver response to distinguish between a desired receiver response frequency and an undesirable interference frequency, said calculator comprising:

a first circular disk rotatable about its center, said first disk having a first graduated frequency scale and numerals disposed thereon in a circular path and adjacent the outer periphery of said disk and a second graduated frequency scale disposed thereon along a circular path, said circular paths being concentric to each other and to the center of said disk, said second graduated scale being disposed closer to the center of said disk, and radial straight lines on said first disk originating from the center thereof and indicating interference frequencies; and

a second disk rotatable about the center of said first disk and having a center, said second disk having a first arcuate window disposed concentric with the centers of said disks and adjacent to the periphery of said first disk for exhibiting therethrough limited frequency response bands on said first graduated scale and second and a third arcuate windows on said second disk and disposed for exhibiting therethrough a limited frequency response of said second scale, said first window and said second and third windows being concentric to each other, a first set of elongated windows having straight edges in the long direction and extending between said first arcuate window and said second and third arcuate windows and being offset from the center of rotation of said disks for exhibiting there-

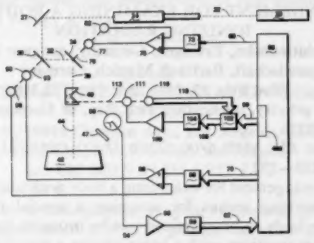


through portions of one or more of said radial lines, a second set of arcuate windows concentric with said first, second and third arcuate windows and disposed closer to the center of said disks than said second and third arcuate windows for exhibiting therethrough portions of said radial lines, said first arcuate window having radially, inwardly extended window portions thereon for exhibiting therethrough numerals on said first scale.

4,124,797
APPARATUS AND METHOD FOR READING RANDOMLY ORIENTED CHAPACTERS

David P. Himmel, Dallas, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Oct. 31, 1977, Ser. No. 847,348
Int. Cl.[2] G06K 7/10, 9/00, 7/14
U.S. Cl. 235—467 16 Claims



1. An orientation compensation system to read characters on a written medium disposed in a random orientation with respect to said system, said characters having a fixed orientation to an indicia located adjacent to said characters, comprising:

a. a narrow beam of light being scanned across said indicia in a known sequence;

b. a beam rotating means receiving said beam for rotating

incident radiations of said beam to alter the orientation of said known sequence relative to said indicia;

c. a light sensor positioned to respond to the level of light reflected from said written medium and said indicia thereon;

d. a processor receiving the output of said light sensor for determining the angle between observed orientation of said known sequence to said indicia and a desired predetermined orientation of said known sequence to said indicia, said processor generating a signal corresponding to a said angle; and

e. motor means for rotatably moving said beam rotating means in response to said signal to scan said characters with said known sequence at said predetermined orientation thereto.

4,124,798

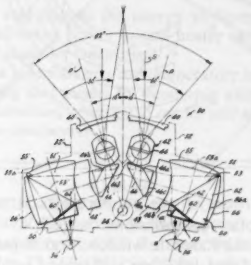
OPTICAL VIEWING APPARATUS

Kenneth B. Thompson, P.O. Box 4, Leona Valley, Calif. 93550

Filed Dec. 9, 1965, Ser. No. 512,627

Int. Cl.[2] G02B *23/12*

U.S. Cl. 250—213 VT **16 Claims**



1. Optical apparatus, comprising:

a concave, substantially spherical reflecting surface;

an image intensifier along the optical axis of said reflecting surface and having entrance and exit image faces, said exit face being substantially coincident with the focal surface of said reflecting surface;

an optical objective system for producing an image substantially coincident with the entrance face of said image intensifier; and

a partially reflecting, partially transmitting beamsplitter interposed between said image intensifier and said reflecting surface.

4,124,799

ARRANGEMENT FOR EXAMINING A BODY WITH IONIZING RADIATION

Rudolf Schittenhelm, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

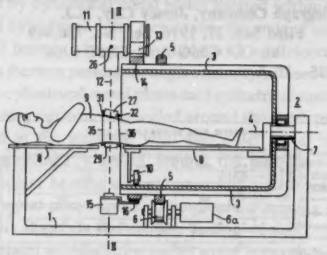
Filed Feb. 25, 1977, Ser. No. 772,318

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1976, 2609226

Int. Cl.[2] A61B *6/00*; G01D *18/00*; G01N *23/08*

U.S. Cl. 250—252 **8 Claims**

1. An arrangement for examining a body with ionizing radiation, comprising means for scanning a spacial region into which the body to be examined can be brought, from numerous angular positions with a beam having a pencil-like to fan-like formation, radiation detector means disposed in a centered or aligned fashion on the opposite side of the spacial region for supplying measured attenuation coefficients for the individual radiation paths, thereby to enable the generation of a computer tomograph, characterized in that, in order to determine the density distribution in a matrix of attenuation coefficients, test bodies are introduced into the spacial region to be scanned by the beam, said test bodies having the same percentage contents of the same elements as are present in the particular body volume to be determined, and having a density which is



adapted as far as possible to the body volume, said density being, however, graduated.

4,124,800

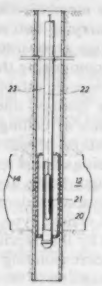
METHOD FOR DETERMINING RESIDUAL OIL SATURATION OF A FORMATION

Forest R. Mitchell, Humble; Joseph D. Robinson, and John P. Vogiatzis, both of Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 26, 1976, Ser. No. 708,463

Int. Cl.[2] G01V *5/00*

U.S. Cl. 250—260 **15 Claims**



1. A method for determining the residual oil saturation of a formation penetrated by a borehole, said formation having been reduced to residual oil saturation by natural or induced water or aqueous solution displacement, said method comprising:

injecting an aqueous solution of a gamma emitting radioactive tracer of known specific activity into the portion of said formation surrounding the borehole to substantially remove all of the indigenous water in the formation, but not the oil for a radius of interest;

measuring the gamma response of the portion of the formation surrounding the borehole to obtain a first gamma log;

chemically or otherwise flooding the portion of the formation surrounding the borehole to remove substantially all the residual oil;

injecting sufficient aqueous solution of a gamma emitting radioactive tracer of known specific activity into the portion of the formation surrounding the borehole to remove all of the chemical or other flooding material plus any driving fluids from the formation for the radius of interest;

measuring the gamma response of the portion of the formation surrounding the borehole to obtain a second gamma log; and

determining the residual oil saturation from the first and

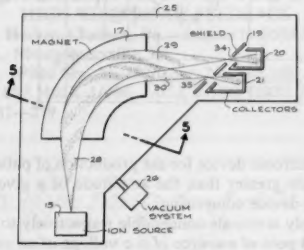
second gamma logs and the known specific activities of the injected solutions.

4,124,801

APPARATUS AND PROCESS FOR SEPARATING MATERIALS

Leslie J. Cook, Pasadena; Alvin T. Forrester, Beverly Hills; John F. Mahoney, South Pasadena; Julius Perel, Altadena, and Kenneth E. Vickers, Sierra Madre, all of Calif., assignors to Phrasor Technology Incorporated, Pasadena, Calif.

Filed Sep. 24, 1976, Ser. No. 726,298
Int. Cl.[2] B01D *59/44*
U.S. Cl. 250—288 **29 Claims**



1. In an apparatus for separating materials, the combination of:

a container;

a source mounted in said container for producing a first beam of positive ions of the materials to be separated, said source including

means providing a supply of said materials in liquid form,

means defining an outlet opening,

means for delivering the liquid materials to said outlet opening, and

means providing an electric field at said outlet opening for producing field emission of ions from said liquid;

first and second ion collectors mounted in said container;

magnet means providing a magnetic field transverse to said first ion beam deflecting said ions along paths of different radii producing second and third ion beams directed to said first and second collectors, respectively;

means for introducing electrons into the positive ion beam; and

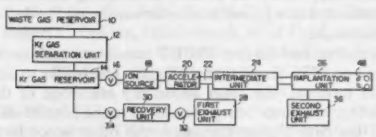
means for connecting a vacuum system to said container.

4,124,802

METHOD AND APPARATUS FOR IMPLANTING RADIOACTIVE GAS IN A BASE MATERIAL

Mititaka Terasawa, Yokohama; Katsuhiko Mawatari, and Osamu Morimiya, both of Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1976, Ser. No. 699,655
Claims priority, application Japan, Jun. 24, 1975, 50-78016
Int. Cl.[2] H01J *37/28*
U.S. Cl. 250—492 A **17 Claims**



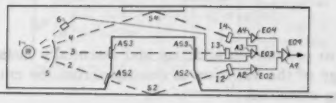
1. A method for permanent disposal of radioactive waste gases which comprises the steps of ionizing the waste radioactive gas to produce positive ions; accelerating said ionized radioactive gas to have high energy; and implanting said accelerated radioactive ion in a base material for permanent disposal.

4,124,803

SURFACE FINISH MONITOR

Kenneth Bowers, 1251 Picasso Dr., Sunnyvale, Calif. 94087

Filed Dec. 22, 1976, Ser. No. 753,193
Int. Cl.[2] G01N *21/48*
U.S. Cl. 250—559 **3 Claims**



1. Structure comprising:

a radiant energy source;

a first sensing means:

first path means for transmitting radiant energy from said source to the surface of a material, and for transmitting radiant energy reflected from said surface to said first sensing means, said first sensing means producing a first intermediate signal representing the radiant energy from said source reflected by said surface;

a second sensing means;

second path means for transmitting radiant energy from said source through substantially the same environment passed through by the radiant energy transmitted by said first path means to said second sensing means, said second sensing means producing a second intermediate signal representing the radiant energy transmitted through said second path means.

a third sensing means;

third path means for transmitting radiant energy from said source to the surface of a reference standard, and for transmitting the radiant energy reflected by said reference standard to said third sensing means, said third sensing means producing a third intermediate signal representing the radiant energy reflected by said reference standard;

a fourth sensing means;

fourth path means for transmitting radiant energy from said source to fourth sensing means, said fourth sensing means producing a fourth intermediate signal representing the radiant energy of the said radiant energy source only;

means for processing said first, second, third and fourth intermediate signals to provide a measure of the radiant energy reflected by said surface of a material, said measure being independent of environmental contaminants which interfere with the radiant energy transmitted through said first path means; also independent of degradation of said radiant energy source.

4,124,804

COMPTON SCATTER SCINTILLATION CAMERA SYSTEM

Stuart Mirell, 10816 Cushdon Ave., Los Angeles, Calif. 90064

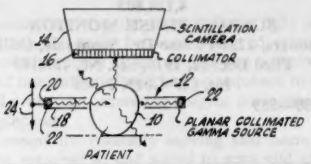
Filed Dec. 17, 1976, Ser. No. 751,608
Int. Cl.[2] G01N *23/00*; G01T *1/20*
U.S. Cl. 250—358 R **6 Claims**

1. A sectional radiographic imaging system comprising:

a planar-collimated source of gamma radiation located to provide essentially simultaneous irradiation of an entire plane of an object to be examined; and

a scintillation camera located to detect scattered radiation across a plane substantially parallel to the plane being examined, and including collimation means arranged to restrict the detected radiation to scattered rays having trajectories substantially normal to the two planes, whereby the gamma radiation is confined to the plane being examined and gives rise to Compton-scattered radi-

ation emanating from that plane, the scattered rays normal to the two planes being detected in said scintillation cam-



era to provide an accurate and essentially instantaneous image of the variation in density across the entire plane being examined.

4,124,805

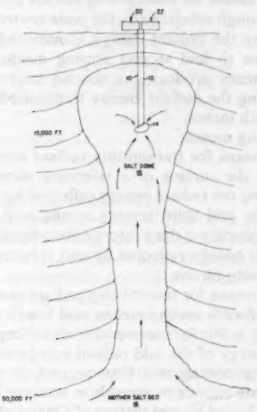
POLLUTION-FREE POWER GENERATING AND PEAK POWER LOAD SHAVING SYSTEM

Charles H. Jacoby, Dalton, Pa., assignor to International Salt Company, Clarks Summit, Pa.

Continuation of Ser. No. 188,856, Oct. 13, 1971, abandoned. This application Feb. 24, 1975, Ser. No. 552,376

Int. Cl.[2] H02P 9/04

U.S. Cl. 290—1 R **6 Claims**



1. The method not only of augmenting but also increasing the power output of an electrical power generating system, which comprises the steps of:

(a) forming an underground cavity in a salt dome at such a depth that the walls of the cavity are substantially continuously at a selected elevated temperature;

(b) generating electrical power at a surface facility;

(c) diverting a selected amount of the power generated in step (b), during a low demand period and in advance of anticipated peak demand period, by pumping a compressible gas into initially low pressure and low temperature storage within said underground cavity;

(d) closing off said cavity at a selected time sufficiently in advance of said anticipated peak demand period to allow the temperature of the gas stored in step (c) substantially to attain said selected elevated temperature and

(e) augmenting power generated in step (b) and increasing the total output of said surface facility by opening said cavity during the peak demand period and releasing said gas to drive auxiliary power generating equipment by recovery not only of said selected amount of power diverted in step (c) but also of the heat energy supplied by said cavity.

4,124,806

ELECTRONIC DEVICE FOR THE PRODUCTION OF SIGNALS OF AN AMPLITUDE GREATER THAN THE AMPLITUDE OF A GIVEN PERIODIC SIGNAL

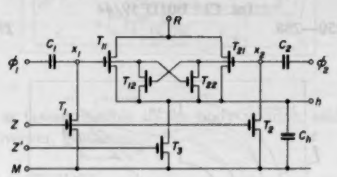
André Rusznyak, Geneva, Switzerland, assignor to Ebauches S.A., Neuchâtel, Switzerland

Filed May 6, 1977, Ser. No. 794,618

Claims priority, application Switzerland, May 7, 1976, 5721/76

Int. Cl.[2] H03K 1/14, 4/02, 3/353; G04C 3/00

U.S. Cl. 307—264 **12 Claims**



1. An electronic device for the production of pulse signals of an amplitude greater than the amplitude of a given periodic signal, said device comprising:

two supply terminals connectible respectively to a first and second pole of a source of d-c voltage of an amplitude at least equal to the one desired for the said pulse signals, a first of these terminals being a common point of the circuit of the device;

a first input terminal connectible to a first source of periodic voltage producing signals whose period is submultiple of the duration of each of said pulse signals;

a second input terminal connectible to a second source of periodic voltage of the same frequency but phase-opposed in relation to the periodic voltage provided by the first periodic voltage source;

a third input terminal to receive the said periodic signals;

an output terminal to which the said pulses are supplied:

a first IGFET charge transistor connected by one of its secondary electrodes to the said output terminal and by its other secondary electrode to the second of the said supply terminals, the control electrode of the first IGFET charge transistor being connected to the said first terminal through a first coupling circuit including at least one condenser connected at one side to the said control electrode of said first charge transistor;

a second IGFET charge transistor connected by one of its secondary electrodes to the said output terminal and by its other secondary electrode to said second supply terminal, the control electrode of said second IGFET charge transistor being connected to said second input terminal through a second coupling circuit including at least one condenser connected at one side to said control electrode of said second charge transistor;

first and second IGFET decoupling transistors connected by their respective control electrodes to the said third input terminal and by one of their respective secondary electrodes to the plates of the condensers included respectively in the first and second coupling circuits, the other secondary electrode of each decoupling transistor being connected to a power source for supplying the decoupling transistors;

first and second further IGFET transistors each connected by one of its respective secondary electrodes to said output terminal, the other secondary electrode of the first further transistor being connected to the control electrode of the first charge transistor, the other secondary electrode of the second further transistor connected to the control electrode of the second charge transistor, the control electrode of the first further transistor being connected to the control electrode of the second charge transistor, the control electrode of the second further

transistor being connected to the control electrode of the first charge transistor;

at least one storage condenser inserted between a first junction point of the circuit connected to said output terminal and said first supply terminal;

means for controlling the discharge of said storage condenser associated with said first junction point of the circuit during a predetermined no-signal period; and

means for controlling the discharge of the stray capacity of the control electrode of each charge transistor during at least part of the said no-signal period, all said transistors being of the same conduction type.

4,124,807

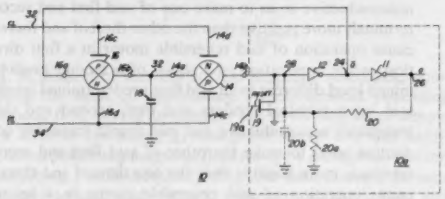
BISTABLE SEMICONDUCTOR FLIP-FLOP HAVING A HIGH RESISTANCE FEEDBACK

Richard J. Herber, Chalfont, Pa., assignor to Solid State Scientific Inc., Montgomeryville, Pa.

Filed Sep. 14, 1976, Ser. No. 723,100

Int. Cl.[2] H03K *3/286, 3/353, 27/00;* H03B *19/14*

U.S. Cl. 307—279 **10 Claims**



1. A CMOS bistable semiconductor flip-flop circuit having two stable states formed on a CMOS chip having an N-substrate comprising

first and second inverters forming a storage element each having a substantially low output impedance in both said stage states and each having an input and an output,

coupling means connecting said output of said second inverter to said input of said first inverter,

means for applying a switching voltage to said second inverter input,

high resistance means connecting said output of said first invertor to said input of said second inverter, said high resistance means being of resistance value which is substantially high with respect to the low output impedance of said first inverter to permit said second inverter input to change in potential to that of the switching voltage and allow said switching voltage to propagate through both inverters before termination of said switching voltage thereby to change the stable state of said storage element, said high resistance means comprising a high resistivity resistor boron ion implanted through an overlying gate oxide layer forming a high resistance P- region within said N-substrate, said resistor having a guarded layer overlied by said gate oxide layer, and a glass passivation layer overlying said resistor.

4,124,808

MOS ON-CHIP VOLTAGE SENSE AMPLIFIER CIRCUIT

Mark S. D. Shieu, San Jose; Ronald C. Laugesen, Sunnyvale, and Robert C. Dobkin, Hillsborough, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jan. 28, 1977, Ser. No. 763,380

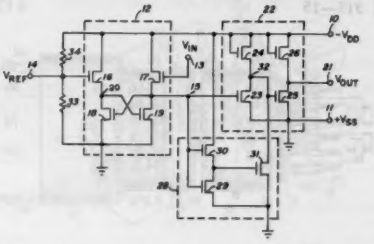
Int. Cl.[2] H03K *1/02, 5/18*

U.S. Cl. 307—362 **5 Claims**

1. An integrated MOS voltage sense amplifier circuit having the property of switching an output between high and low states in response to the relation between an input voltage and a reference voltage, said circuit comprising:

comparator amplifier means having two voltage responsive input terminals and a single output terminal, the voltage level at said output terminal being a function of the difference in voltage levels at said input terminals and MOS process variables;

buffer amplifier means having an input terminal coupled to said comparator amplifier means output terminal and an output terminal defining said output of said circuit; and



compensating amplifier means having an input coupled to said comparator amplifier means output terminal and an output coupled to a node in said buffer amplifier means, said compensating amplifier means having an output conduction proportional to its input voltage whereby said circuit output switches as a function of the difference in voltage levels at said input terminals of said comparator amplifier means independent of said process variables.

4,124,809

QUARTZ CRYSTAL RESONATOR

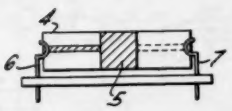
Jean Engdahl, Bienne, and Raymond Huguenin, Port, both of Switzerland, assignors to Societe Suisse pour l'Industrie Horlogere Management Services S.A., Bienne, Switzerland

Continuation of Ser. No. 364,266, May 29, 1973, abandoned. This application Nov. 14, 1974, Ser. No. 523,829

Claims priority, application United Kingdom, May 30, 1972, 25307/72

Int. Cl.[2] H01L *41/10*

U.S. Cl. 310—361 **7 Claims**

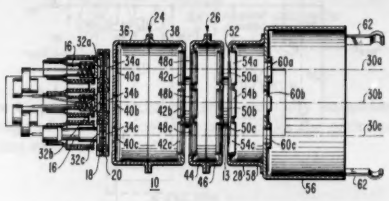


1. A piezo electric resonator member of a dimension suitable for use in watches having a predictably stabile frequency around or, over 1 MHz, said resonator comprising a thickness shear AT cut rectangular bar of quartz crystal, said bar being elongated along the Z′ axis of the quartz and having rectangular cross sections in planes parallel to the XZ′ and XY′ planes, said bar having metallized layers to serve as electrodes confined entirely to a relatively small, with respect to length, central zone of, but extending to the full width of, each of the surfaces running in the same direction as the XZ′ plane, Y′ and Z′ being the rotated axes whereby the resonator vibrates in an energy trapping mode with vibrations being substantially confined to said relatively small central zone, the ends of the bar being employed as support points.

4,124,810
ELECTRON GUN HAVING A DISTRIBUTED ELECTROSTATIC LENS

David P. Bortfeld, Kendall Park; Roger W. Cohen, Trenton, and David A. de Wolf, Princeton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jun. 6, 1977, Ser. No. 804,004
Int. Cl.[2] H01J *29/46, 29/56*
U.S. Cl. 315—15 6 Claims



1. In an electron gun for producing and directing at least one electron beam along a beam path, said gun including:

(a) a beam forming region;

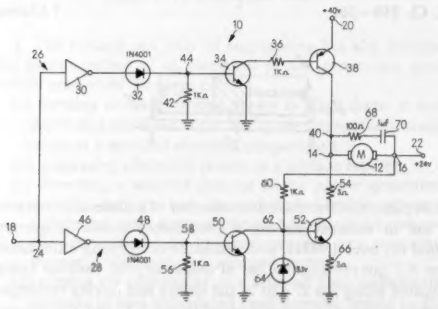
(b) a three-electrode coupled focus lens system consisting of a first accelerating and focusing electrode, a final accelerating and focusing electrode and an intermediate accelerating and focusing electrode disposed between said first accelerating and focusing electrode and said final accelerating and focusing electrode, said intermediate electrode forming a substantially cylindrical electron lens element of radius R and length L_m surrounding said beam path where L_m is substantially equal to R; and

(c) means for applying a first potential Φ_3 to said first accelerating and focusing electrode, a second potential Φ_4 to said intermediate electrode and a third potential Φ_5 to said final accelerating and focusing electrode, where $\Phi_3 < \Phi_4 < \Phi_5$.

4,124,811
CIRCUIT FOR BI-DIRECTIONALLY POWERING A MOTOR

Merril J. Anderson, Salt Lake City, Utah, assignor to Sperry Rand Corporation, New York, N.Y.

Filed Sep. 12, 1977, Ser. No. 832,263
Int. Cl.[2] H02P *13/14*
U.S. Cl. 318—293 4 Claims



1. A bi-directional motor drive circuit, comprising:

first and second terminals having a reversible DC electric motor connected therebetween;

a single input terminal;

third and fourth terminals for connection to voltage sources of unequal positive potential such that the voltage supplied to said third terminal will be at higher potential than that supplied to said fourth terminal, said latter terminal being connected to said second terminal;

a first circuit branch including a first transistor of one conductivity type and a second transistor of an opposite conductivity type; said first transistor having a base interconnected to said input terminal, a collector, and an emitter coupled to ground potential; said second transistor having a base interconnected to said collector of said first transistor, an emitter coupled to said third terminal, and a collector coupled to said first terminal; and

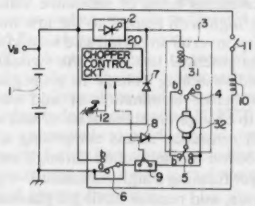
a second circuit branch including third and fourth transistors each being of said one conductivity type; said third transistor having a base interconnected to said input terminal, a collector, and an emitter coupled to ground potential; said fourth transistor having a base interconnected to said second terminal as well as to said collector of said third transistor, a collector interconnected to said first terminal, and an emitter interconnected to ground potential,

whereby application of an electrical signal of a first predetermined level to said input terminal renders said first, second and third transistors conductive and said fourth transistor nonconductive so as to make one of said first and second terminals more positive than the other thereof and thereby cause operation of said reversible motor in a first direction, while application of a signal of a second predetermined level different from said first predetermined level to said input terminal renders said first, second and third transistors nonconductive and said fourth transistor conductive so as to make the other of said first and second terminals more positive than the one thereof and thereby cause operation of said reversible motor in a second, opposite direction.

4,124,812
BRAKING CONTROL APPARATUS FOR AN ELECTRIC MOTOR OPERATED VEHICLE

Shotaro Naito; Masahiko Ibamoto; Hisakatsu Kiwaki, and Yoshimitsu Onoda, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 16, 1976, Ser. No. 742,263
Claims priority, application Japan, Nov. 19, 1975, 50-138099
Int. Cl.[2] H02P *3/10, 3/14*
U.S. Cl. 318—371 11 Claims



1. In an electric motive power system including an electric driving motor supplied with power from a battery through a chopper and drive direction switching means for selectively switching the connection of said battery to said electric driving motor to effect forward and backward operation thereof, a braking control apparatus comprising regeneration switch means for switching connection of said battery to said electric drive motor to effect regenerative braking of said motor, detecting means for sensing a predetermined operating condition of said electric driving motor, and control means responsive to said detecting means for operating said regeneration switch means at the time of operation of said drive direction switching means to effect regenerative braking prior to sensing of said predetermined operating condition by said detecting means and for releasing said regeneration switch means in response to said detecting means to thereafter provide plugging braking.

4,124,813
METHOD OF VIEWING NUCLEAR MAGNETIC RESONANCE

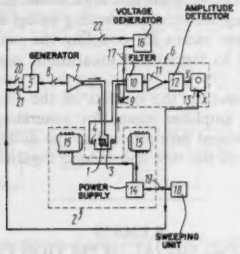
Anatoly E. Mefed, prospekt Mira, 22, kv. 54, Fryazino Moskovskoi oblasti, and Vadim A. Atsarkin, ulitsa Baikalskaya, 23, kv. 36, Moscow, both of U.S.S.R.

Filed Jul. 19, 1976, Ser. No. 706,779

Claims priority, application U.S.S.R., Jul. 25, 1975, 2152903[I]

Int. Cl.[2] G01R *33/08*

U.S. Cl. 324—0.5 A **16 Claims**



1. A method of viewing nuclear magnetic resonance, comprising the steps of: establishing a unidirectional polarizing magnetic field having an intensity H_0; immersing a test sample of a material containing gyromagnetic nuclei into said unidirectional polarizing magnetic field set up by a magnetic system; establishing a radio-frequency magnetic field directed perpendicularly to said unidirectional polarizing magnetic field and having an amplitude $2H_1$; subjecting said test sample to the effect of a radio-frequency magnetic field selecting the amplitude of said radio-frequency magnetic field so as to exceed the average local magnetic field induced by the gyromagnetic nuclei of said sample; viewing the component of magnetization of said test sample longitudinal to said unidirectional polarizing magnetic field at a frequency of nuclear magnetic resonance in an effective magnetic field H_{ef} the value whereof is calculated from the relationship:

$$H_{ef} = \sqrt{(H_O - \frac{\omega}{\gamma})^2 + H_1^2},$$

where H_0 = intensity of said unidirectional polarizing magnetic field, H_1 = half amplitude of said radio-frequency magnetic field, ω = frequency of said radio-frequency magnetic field, γ = gyromagnetic ratio of nuclei in said test sample; viewing said longitudinal components of magnetization with the aid of a pick-up coil which is electrically coupled to a receiver tuned to the frequency of nuclear magnetic resonance in said effective magnetic field; and viewing of nuclear magnetic resonance by changes in said longitudinal component of magnetization.

4,124,814
MAGNETIC DISPLACEMENT TRANSDUCER WHEREIN TWO RELATIVELY MOVABLE GRATINGS VARY THE MAGNETIC FIELD COUPLED TO A HALL PLATE PROPORTIONAL TO THE DISPLACEMENT

Albert L. Lauerman, Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 3, 1977, Ser. No. 839,064

Int. Cl.[2] G01R *33/12*

U.S. Cl. 324—208 **10 Claims**

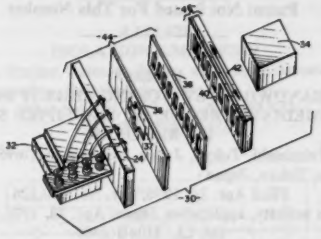
1. In combination:

means to generate a magnetic field,

a substrate positioned in the magnetic field and having a Hall effect material positioned thereon, said Hall effect material having first terminal means to receive a supply of current to energize said Hall effect material and second terminal means to provide a voltage output signal,

magnetic field shunt means having an opening formed therein that is dimensioned to receive said Hall effect material, whereby said shunt means surrounds said Hall effect material so that the magnetic field is shunted thereabout, and

first and second grating means, each of said grating means positioned in the magnetic field and adjacent said substrate



said second grating means adapted to be removed through the magnetic field relative to said first grating means and to said substrate to thereby alter the strength of the magnetic field path that is leaked through respective apertures formed in each of said first and second grating means so as to control the flux density which penetrates said Hall effect material, whereby a displacement of said second grating means is reflected by an output voltage from said Hall effect material, which output voltage corresponds to said displacement.

4,124,815
RADIO AND/OR TELEPHONE COMMUNICATION SYSTEM FOR A FLEET OF VEHICLES

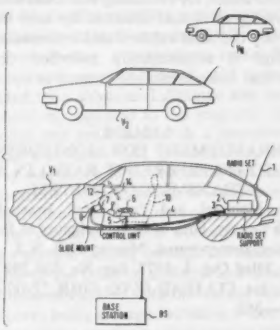
Michael Stoschek, Schleifschrot, 8631 Ahorn, Germany

Filed Apr. 21, 1977, Ser. No. 789,523

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1976, 2618701

Int. Cl.[2] H04B *3/60*

U.S. Cl. 325—51 **1 Claim**



1. A system for communication between one of a plurality of vehicles and a communication partner composed of at least one other vehicle or an exchange, comprising: a plurality of vehicles; each vehicle having radio set mounting means fixedly mounted in the vehicle for holding and electrical connection to a radio set, control unit mounting means fixedly mounted in the vehicle for holding and electrically connecting to a control unit, a receiver fixedly mounted in the vehicle, a radio antenna fixedly mounted to the vehicle, cable means in the vehicle for electrically connecting said radio set mounting means and said control unit mounting means as well as said receiver and said antenna to each other; a plurality of radio sets smaller than the plurality of the vehicles, a plurality of control units smaller than the plurality of vehicles, said radio sets and said control units being removably mounted in predetermined ones of said

mounting means at any one time while others of said mounting means remain empty of radio sets and control units, said mounting means including one of self-locking mounting supports and slide mounts.

4,124,816

Patent Not Issued For This Number

4,124,817

BANDWIDTH SWITCHING CIRCUIT FOR INTERMEDIATE FREQUENCY AMPLIFIER STAGE IN FM RECEIVER

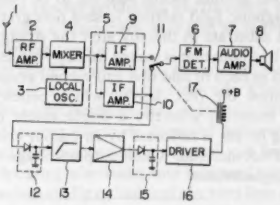
Tetsuo Takahashi, Tokyo, Japan, assignor to Torio Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1976, Ser. No. 680,226

Claims priority, application Japan, Apr. 28, 1975, 50-51651

Int. Cl.[2] H04B *1/06*

U.S. Cl. 325—344 **7 Claims**



1. In a bandwidth switching circuit of an FM receiver to switch the bandwidth of an intermediate frequency amplifier stage from a wide bandwidth to a narrow bandwidth and vice versa, the improvement comprising first means for detecting in the signals received by said receiver beat components due to interference between stations adjacent in carrier frequency, said beat components being included in the amplitude modulation components contained in the intermediate frequency signal, and second means for switching said bandwidth switching circuit according to signals detected by said first detecting means, whereby the bandwidth of said intermediate frequency amplifier stage is automatically switched depending on whether the beat components are present or not.

4,124,818

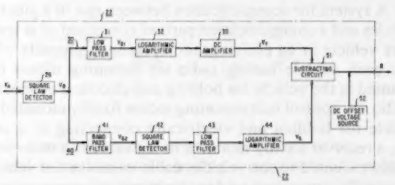
ARRANGEMENT FOR MONITORING SIGNAL-TO-INTERFERENCE RATIO IN A RADIO TRANSMISSION SYSTEM

Sing H. Lin, Holmdel, and Yu S. Yeh, Freehold Township, Monmouth County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 4, 1977, Ser. No. 839,299

Int. Cl.[2] H04B *17/00*; G01R *27/00*

U.S. Cl. 325—363 **5 Claims**



1. In an apparatus for generating a first quantity indicative of the amplitude ratio of a desired information component and an undesired interference component of an interference-susceptible radio signal:

first and second square-law detecting means;

first and second low-pass filter means;

band-pass filter means having a passband extending substantially down to but not including zero frequency;

first and second logarithmic amplifier means;

means for coupling a replica of the radio signal to the input of the first detecting means;

means for coupling the output of the first detecting means to the inputs of the first low-pass filter means and the band-pass filter means, respectively;

means for coupling the output of the first low-pass filter means to the input of the first logarithmic amplifier means;

means including the second detecting means and the second low-pass filter means for coupling the output band-pass filter means to the second logarithmic amplifier means; and

means responsive to the outputs of the first and second logarithmic amplifier means for generating, as the first quantity, a signal proportional to the difference between the outputs of the first and second logarithmic amplifier means.

4,124,819

DISTURBING SIGNAL DETECTION CIRCUIT

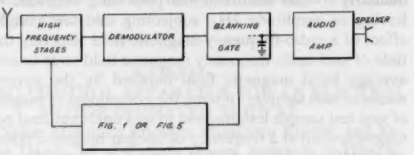
Jens Hansen, Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed Mar. 14, 1977, Ser. No. 777,335

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1976, 2613470

Int. Cl.[2] H04B *1/10*

U.S. Cl. 325—479 **6 Claims**



1. A disturbance pulse detection system for a radio receiver equipped with a blanking gate circuit in a signal path of the receiver, comprising:

means for picking up both received signals and disturbance pulses from a circuit in the receiver where the received signals have the form of a periodic wave of steady or gradually modulated amplitude, and for supplying said signals and pulses at at least one output outside the signal path of said receiver;

clamp circuit means connected to an output of said pick-up means, comprising a diode having a first terminal connected to circuit ground potential, a capacitor connected between an output of said pick-up means and a second terminal of said diode, for producing a clamped signal voltage in which recurring peaks of said signals do not substantially exceed the forward threshold voltage of said diode, and for producing a voltage peak, relative to said circuit ground potential, substantially exceeding said forward threshold voltage in response to a pulse-type disturbance, and means connected to the junction of said capacitor and diode for providing a forwardly-biasing current to said diode;

detecting amplifier means having a control circuit responsive to the output of said clamp circuit for selectively amplifying said voltage peaks substantially exceeding said threshold voltage, while producing substantially no response to voltages not substantially exceeding said threshold voltage, and

means for applying the output of said detecting amplifier to a control terminal of said blanking gate so as to close said blanking gate during the presence of a voltage peak produced by said detecting amplifier.

4,124,820

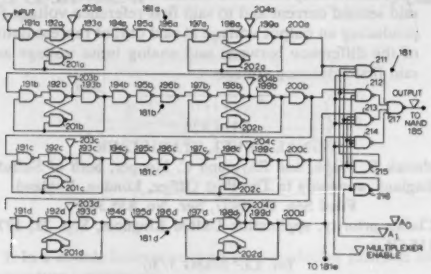
ASYNCHRONOUS DIGITAL DELAY LINE

Walter Arnstein, Saratoga, Calif., assignor to American Videonetics Corporation, Sunnyvale, Calif.

Division of Ser. No. 618,624, Oct. 1, 1975, abandoned. This application Mar. 28, 1977, Ser. No. 781,583

Int. Cl.² H03K *3/86, 5/04*

U.S. Cl. 328—55 **5 Claims**



1. An asynchronous digital delay line for delaying amplitude limited frequency modulated impulses of predetermined constant short duration carrying information on the leading edges thereof comprising a plurality of digital gates connected in cascade to form a tandem array wherein each gate provides a known increment of delay and wherein at least one of said gates additionally comprises pulse restoration means for regenerating said impulses passing through said delay line to be of said predetermined constant short duration.

4,124,821

ANALOG TO FREQUENCY CONVERTOR

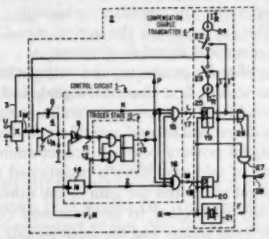
Jan Petr, Zug, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Filed Aug. 15, 1977, Ser. No. 824,736

Claims priority, application Switzerland, Aug. 25, 1976, 10804/76

Int. Cl.² H03K *13/02*

U.S. Cl. 328—151 **12 Claims**



1. An analog to frequency convertor for deriving by a charge quantity compensation process, an output signal proportional in frequency to the magntidue of a current or voltage input to said analog to frequency convertor, comprising:

integrating means for receiving said input to the analog to frequency convertor to supply an output dependent thereon, said integrating means including a capacitor;

threshold circuit means coupled to said capacitor, for responding when the voltage across said capacitor reaches at least one predetermined level;

compensating charge transmitter means having its output coupled to said capacitor for supplying a constant increment of charge to said capacitor each time said threshold circuit means responds;

control circuit means coupled to said threshold circuit means for developing a periodic digital polarity signal, the logic value of which polarity signal controls both the polarity of said input to the analog to frequency convertor and the polarity of said increment of charge supplied to said capacitor, said logic value always changing at a predetermined level of said voltage across said capacitor; and

means to derive said output signal dependent upon the frequency with which said increments of charge are supplied to said capacitor.

4,124,822

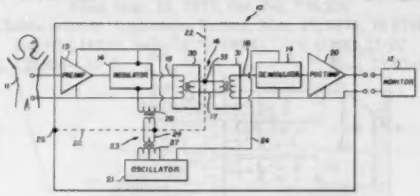
ISOLATION AMPLIFIER

Thomas K. Naylor, Belmont, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Sep. 16, 1977, Ser. No. 833,932

Int. Cl.² H03F *3/38*

U.S. Cl. 330—10 **10 Claims**



1. In a DC amplifier providing a high degree of conductive isolation between its input and output, said amplifier including an input section, an output section and an oscillator section, said input section including a modulator to produce an AC signal corresponding to the DC input signal, said output section including a demodulator adapted to receive said AC signal from said modulator and to produce a corresponding DC output signal therefrom and said oscillator section producing an AC energizing signal for said modulator and demodulator, first and second circuit means respectively non-conductively coupling said AC signal from said modulator to said demodulator and said AC energizing signal from said oscillator to said input section, third circuit means for coupling said AC energizing signal from said oscillator to said output section, at least said first non-conductive coupling means comprising first and second substantially closed-loop cores of magnetic material, each said core having a respective center-line extending through the central opening thereof, said cores being physically separated by a substantial distance and each carrying a winding inductively coupled to the magnetic material of the associated core and associated with a respective one or the other of said modulator and demodulator, and conductor means linking said first and second cores and inductively coupling the magnetic paths thereof, the improvement wherein said conductor means forms a unitary closed-loop linking each of said first and second cores with a plurality of turns, each said turn having a portion passing through the central opening of a respective one or the other of said first and second cores, said plurality of turns associated with one or the other of said first and second cores being arranged relative to one another about the center-line of the respective said core to minimize the net emf induced in said plurality of turns by the respective component of an external magnetic field substantially normal to the respective plane of each turn of said plurality.

4,124,823

MICROWAVE COUPLER

Franco N. Sechi, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 8, 1976, Ser. No. 739,821

Int. Cl.² H03F *3/60;* **H01P** *5/12*

U.S. Cl. 330—56 **9 Claims**

9. A microwave amplifier comprising:

a first rectangular waveguide adapted to receive a microwave signal that causes a propagation of electromagnetic

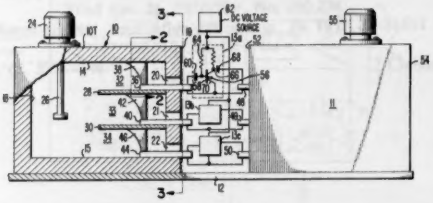
energy in a TE_{10} mode within said first rectangular waveguide from a closed end towards a multiport end thereof;

an electrically conductive sheet, connected between opposed interior surfaces of said first rectangular waveguide, that divides a part thereof into a first pair of smaller waveguides;

first and second power amplifiers;

means for coupling microwave power from each of said first smaller waveguides through the multiport end of said first rectangular waveguide to an input of said first amplifier and an input of said second amplifier, respectively;

a second rectangular waveguide adapted to provide microwave power in response to a propagation therein of electromagnetic energy in a TE_{10} mode from a multiport end towards a closed end of said second rectangular waveguide;



an electrically conductive sheet connected between opposed interior surfaces of said second rectangular waveguide that divides a part thereof into a second pair of smaller waveguides;

means for coupling microwave power from the output of said first amplifier and the output of said second amplifier to each of said second smaller waveguides, respectively, through the multiport end of said second rectangular waveguide to cause said propagation of electromagnetic energy therein; and

means for connecting said second rectangular waveguide to a load that receives said microwave power from said amplifiers in response to the propagation of electromagnetic energy within said second rectangular waveguide.

4,124,824

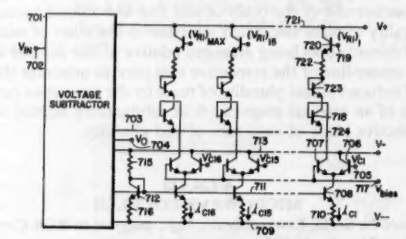
VOLTAGE SUBTRACTOR FOR SERIAL-PARALLEL ANALOG-TO-DIGITAL CONVERTER

Stephen J. Kreinick, San Diego, Calif.; Fuad H. Musa, and Pern Shaw, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 31, 1977, Ser. No. 764,491

Int. Cl.² H03F *3/45*

U.S. Cl. 330—252 **9 Claims**



1. A subtractor circuit comprising:

an output;

a first input for receiving an analog input voltage;

a second input for receiving a first reference voltage;

a conductor for receiving a second reference voltage;

a first means coupled to said input and to said conductor and responsive to said analog input voltage for producing a first current which is a function of the difference between said analog input voltage and said second reference voltage;

first current source means responsive to said first current for producing a second current which is proportional to said first current;

second means coupled to said second input and responsive to said second current and to said first reference voltage for producing an output voltage at said output representative of the difference between said analog input voltage and said first reference voltage.

4,124,825

SIGNAL LEVEL STABILIZER

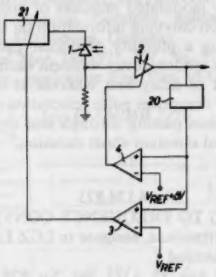
Roderick P. Webb, and Raymond C. Hooper, both of Suffolk, England, assignors to The Post Office, London, England

Filed Sep. 21, 1977, Ser. No. 835,370

Claims priority, application United Kingdom, Sep. 21, 1976, 39115/76

Int. Cl.² H03G *3/30*

U.S. Cl. 330—279 **10 Claims**



1. A signal level stabilizer for producing, in response to optical input signals having powers within a range of optical powers, an output electrical signal having a substantially constant peak level and having a signal to noise ratio greater than a predetermined value, the stabilizer including:

a first amplifier for receiving the optical signal and producing a first electrical signal in response;

a second amplifier for producing the output electrical signal in response to said first electrical signal; and

first and second feedback loops controlling respectively the gains of said first and second amplifiers so that for a range of input signal powers below a predetermined level the gain of one of said amplifiers is maintained at a substantially constant value and the gain of the other amplifier is automatically controlled to produce said constant level output electrical signal, and for input signals having powers above said predetermined level the gain of said one amplifier is automatically controlled to produce said constant level output electrical signal;

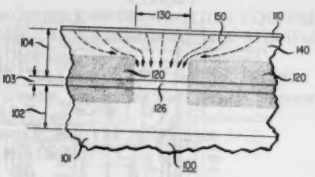
wherein, for fixed values of the power of the input signal and for fixed values of the gain of the second amplifier, particular values of the stabilizer signal to noise ratio are exactly achieved with either of two respective positive values of the gain of the first amplifier and increases to a maximum between these values, so that for each particular value of the signal to noise ratio there is a unique minimum value of the input signal power for which only one value of the gain of the first amplifier corresponds, and

wherein the gain of the second amplifier, is chosen such that the first amplifier has a gain equal or close to the unique value of its gain corresponding to the minimum value of the power of the input signal consistent with the predetermined value of the signal to noise ratio when input signals having powers close to this minimum power are received.

4,124,826
CURRENT CONFINEMENT IN SEMICONDUCTOR LASERS

Richard W. Dixon, Bernardsville; Louis A. Koszi, Scotch Plains, and Franklin R. Nash, Griggstown, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 1, 1977, Ser. No. 773,320
Int. Cl.[2] H01S *3/19*
U.S. Cl. 331—94.5 H **5 Claims**



1. In a double heterostructure semiconductor junction laser, a structure comprising:

a semiconductor body including a pair of opposite conductivity type AlGaAs cladding layers; and a narrower bandgap $Al_zGa_{1-z}As$ ($0 \leqq z \lesssim 0.4$) active region bounded by said layers;

an electrical contact to a p-type major surface of said body for applying forward-bias pumping current to said active region;

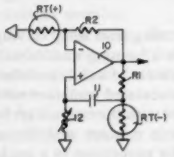
a low resistivity, stripe-like channel through which said current flows from said contact to said active region, thereby to cause recombination of holes and electrons and the emission of stimulated radiation from said active region;

a pair of laterally spaced, higher resistivity proton bombarded zones which bound said channel and constrain said current to flow through said channel characterized in that a Zn diffused semiconductor zone, wider than said channel, separates said contact from said higher resistivity zones and has a lower resistivity than said latter zones so that current from said contact spreads into a semiconductor area wider than said channel before entering said channel and further characterized in that said structure is fabricated by a process which includes the steps of epitaxially growing said active region and cladding layers, selectively proton bombarding the uppermost epitaxial surface down to a depth of approximately said active region to form said higher resistivity proton bombarded zones, and then diffusing Zn atoms into said surface to form said Zn diffused semiconductor zone.

4,124,827
VARIABLE SINUSOIDAL OSCILLATOR

Dale L. Hileman, 1132 Roseta Dr., Topanga, Calif. 90290

Continuation-in-part of Ser. No. 761,522, Jan. 24, 1977, abandoned. This application Nov. 17, 1977, Ser. No. 852,322
Int. Cl.[2] H03B *5/20*
U.S. Cl. 331—135 **3 Claims**

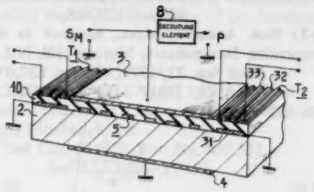


1. A stabilized sinusoidal oscillator consisting of an operational amplifier having an output terminal, an inverting input terminal, and a non-inverting input terminal, said amplifier being connected to achieve unity loop gain by a negative feedback circuit and a positive feedback circuit, said negative feedback circuit consisting of an attenuator connected between the output terminal of said amplifier and the inverting input terminal of said amplifier, and said positive feedback circuit consisting of an attenuator and a single RC network between the output terminal of said amplifier and the noninverting input terminal of said amplifier, wherein the attenuator in at least one of said feedback circuits consists of two voltage-dividing resistors, one a temperature-compensating nonlinear resistor.

4,124,828
SURFACE WAVE DEVICE FOR TREATING SIGNALS

Alain Bert, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 10, 1977, Ser. No. 776,236
Claims priority, application France, Mar. 16, 1976, 76 074930
Int. Cl.[2] H03H *9/26, 9/30;* G06G *7/19;* G11C *27/02*
U.S. Cl. 333—30 R **23 Claims**



1. A surface wave device for treating signals, comprising:

a piezoelectric medium having two opposite surfaces;

at least a first electromechanical transducer for generating elastic waves capable of being propagated on said piezoelectric medium;

a semiconductor medium having two opposite surfaces, the first of its said surfaces, being in contact with the first of said surfaces of the piezoelectric medium, and carrying a mosaic of diodes, the spacing of said diodes being less than half the elastic wavelength;

means for applying a potential difference between the second of said surfaces of the semiconductor medium and the second of said surfaces of the piezoelectric medium, during the propagation of a first signal in said piezoelectric medium so as to memorize that signal by means of said diodes;

means for converting a second signal into an elastic wave propagated in said piezoelectric medium when said first signal is memorized

means for extracting a third signal generated by the interaction of said first and second signals.

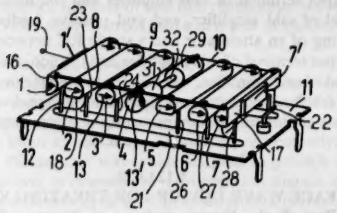
4,124,829
ELECTROMECHANICAL FILTER

Friedrich Kuenemund, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 19, 1977, Ser. No. 760,730
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1976, 2607879
Int. Cl.[2] H03H *9/26, 9/04;* H04R *17/10;* H01L *41/04*
U.S. Cl. 333—71 **10 Claims**

1. An electromechanical filter comprising a plurality of mechanical resonators which are mounted with their axes parallel and are in the form of rods, and lie next to each other in a plane, at least one coupling wire attached to said plurality of resonators to couple them together, input and output electrostrictive transducers connected to the first and last of said resonators and converting electrical energy into mechanical energy and converting mechanical energy into electrical energy, at least one of said plurality of resonators operating in the

torsional mode and at least one additional coupling element for producing at least one attenuation pole connected to said resonator operating in the torsional mode and to at least one other of said resonators which operates in the bending mode.

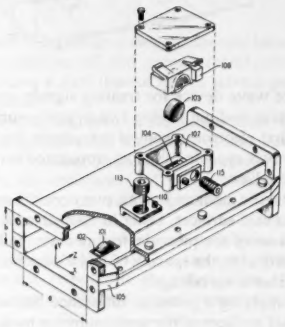


4,124,830

WAVEGUIDE FILTER EMPLOYING DIELECTRIC RESONATORS

Chung-Li Ren, Andover, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 27, 1977, Ser. No. 837,033
Int. Cl.[2] H01P *1/20, 7/06, 1/00*
U.S. Cl. 333—73 W **21 Claims**



1. A waveguide filter comprising a conductively bounded waveguide having a waveguide wall and capable of propagating electromagnetic energy therethrough, an aperture being located in said waveguide wall, a dielectric resonator having a predetermined resonant frequency adaptively mounted in said aperture so that a substantial portion of said resonator is exterior to said waveguide and the remainder of said resonator is within said waveguide.

4,124,831

CIRCUIT BREAKER

Yasuo Kasahara, Tokyo, Japan, assignor to Tokyo Kinzoku Co. Ltd., Japan

Filed Mar. 24, 1977, Ser. No. 781,049
Claims priority, application Japan, Mar. 26, 1976, 51-33267
Int. Cl.[2] H01H *61/02, 61/04*
U.S. Cl. 335—16 **5 Claims**

1. A circuit breaker comprising in combination, a pair of lead terminals,

an attracting magnet member having a conductive magnetic element of which one end is connected to one of said lead terminals,

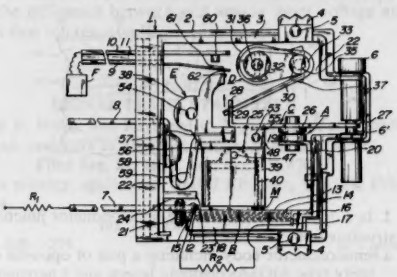
a stationary contact secured to the other end of said attracting magnet member,

a magnet element arranged oppositely against said attracting magnet member,

a magnetic latching member holding said magnet element and arranged in a movable manner integrally with the magnet element against said attracting magnetic member,

a moving spring assembly pivoted to said magnetic latching member,

a moving contact secured at one side of the moving spring assembly with respect to a pivoting shaft and in a position oppositely facing against the stationary contact, which moving contact forms a circuit breaker contact together with said stationary contact, and



a bias spring engaged with said moving spring assembly at the other side with respect to the pivoting shaft and acting to apply a bias force to the magnetic latching member together with the magnet element held therein in a direction away from the attracting magnetic member,

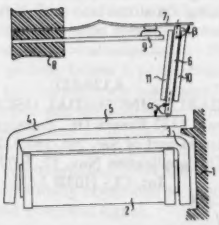
wherein under the closing condition of the circuit breaker in which the magnet element is attracted to the attracting magnetic member and the moving contact is under contact with the stationary contact, the bias spring applies a pressure to the moving contact toward the stationary contact.

4,124,832

ELECTROMAGNETIC RELAY

Georg Aigner, Ebersberg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 15, 1977, Ser. No. 768,784
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1976, 2607048
Int. Cl.[2] H01H *50/58*
U.S. Cl. 335—128 **1 Claim**



1. In an electromagnetic relay having at least one contact spring disposed in a housing and movable between switching positions by movement of a slide member acted upon by movement of a relay associated armature with one end of the slide member in contact with the contact spring and the other end of the slide member in contact with the armature and the slide member guided for movement in a guide, the improvement of angling the slide member with respect to the armature and contact spring, the angle chosen such that movement of the armature and the contact spring during switching causes the contacting ends of the slide to move relative to the armature and contact spring while maintaining contact with the arma-

ture and contact spring whereby a friction movement path exists between the end of the slide and the armature and contact spring, the slide being freely received in a slide guide and being capable of tilting therein providing a friction force between the slide and side walls of the slide guide, the angle being other than 90°, the angle being maintained in relation to the armature and contact spring in every switching position of the relay.

4,124,833

OVERCURRENT PROTECTION EQUIPMENT

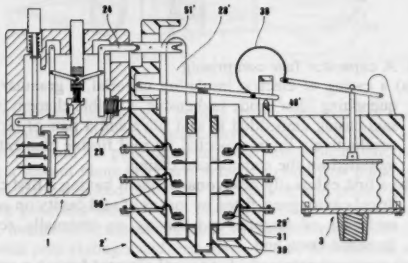
Max H. Stöger, Herzogstandstrasse 16, D-8120 Weilheim, Fed. Rep. of Germany

Filed Feb. 8, 1977, Ser. No. 766,696

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1976, 2605378

Int. Cl.[2] H01H *3/02, 3/12*

U.S. Cl. 335—186 **6 Claims**



1. Electrical bimodal (on-off) control and emergency high current protection switch assembly for an electrical control circuit, said switch assembly using the same electrical contacts for the control purpose and for emergency high current protection, comprising,

switch means having at least one conductor path to be interconnected in the electrical circuit to be controlled,

each conductor path having at least one pair of electrical contacts and first and second contact carriers wherein one contact of each pair is mounted on said first contact carrier and the other contact of each pair is mounted on said second contact carrier.

casing means,

the first contact carrier and the second contact carrier being arranged in said casing means for relative movement therein limited in one direction by the closing of the pair(s) of contacts and having at least an extent of travel in the other direction corresponding to a spread of said contacts sufficient for emergency high current interruption, at least one of said contact carriers being movably guided in said casing means for relative movement therebetween, protective relay means responsive to emergency high current conditions comprising an energy storing spring, a first switch actuating member which is displaceable by said spring, and a control linkage mechanically coupled to said actuating member,

the control linkage comprising means for moving the first actuating member and the spring each from a first released position into a second operational position in which the spring is more tensioned than it is when in said first released position and further comprising latching means for locking the first actuating member and spring in said second position,

releasing means for interconnecting in said electrical circuit and responsive to emergency high current conditions and coupled to the latching means for unlocking the same, under the emergency condition, the first actuating member being free to be displaced under the action of energy storing spring from its second operational to its first released position in the unlocked state,

measuring means responsive to the change of a physical quantity and comprising an element displaced as a function of said physical quantity, said element being coupled through a snap-action spring device to a second actuating member, the second actuating member being coupled with said second contact carrier moveably guided in said casing means a stop for limiting the movement with respect to said casing means of said second actuating member and second contact carrier induced by said snap action spring device in the contact opening sense to a value smaller than necessary for short-circuit interruption but sufficient for interruption of current occurring in the regular non-emergency operation,

the first actuating member being coupled without intervention of said snap-action spring device to the switch means for inducing relative movement of said first and second contact carriers in the sense of contact-spreading when moving from the second operational to the first released position of said actuating means under emergency conditions, to effect the widest spreading of the contacts.

4,124,834

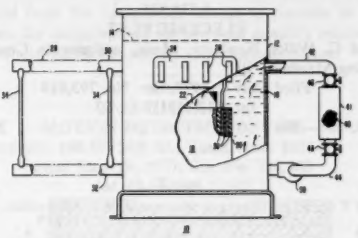
ELECTRICAL INDUCTIVE APPARATUS

Edward J. Walsh, Hermitage, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 5, 1977, Ser. No. 839,532

Int. Cl.[2] H01F *27/10*

U.S. Cl. 336—58 **10 Claims**



1. An electrical transformer, comprising;

a tank,

a polymeric insulating liquid having an inorganic backbone disposed in said tank,

a toxic, organic contaminant in said insulating liquid,

an electrical winding disposed in said tank, said electrical winding being immersed in said insulating liquid,

and an adsorbent material disposed in fluid flow communication with said insulating liquid, said adsorbent material being selected to adsorb the organic contaminant in said insulating liquid, with insignificant adsorption of the insulating liquid.

4,124,835

REMOTELY CONTROLLED UTILITY SERVICE INTERRUPTER SYSTEM AND APPARATUS

William J. Cahill, Jr., 13 Woodthrush Dr., West Nyack, N.Y. 10994

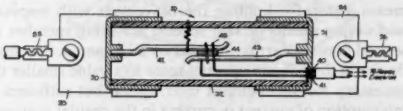
Filed Mar. 26, 1976, Ser. No. 670,661

Int. Cl.[2] H01H *85/00*

U.S. Cl. 337—1 **2 Claims**

1. A remotely operable fuse comprising a fuse body, a pair of spaced electrically conductive members on said body forming electric contacts, electrically conductive fusible means having a pair of opposite ends one of which is electrically connected to one of said contacts and the other of which is electrically connected to the other of said contacts, said electrically conductive fusible means comprising a pair of non-fusible electri-

cally conductive members, one member being electrically connected to and extending from said one of said contacts and the other member being electrically connected to and extending from said other of said contacts to adjacent said one member, and a pellet of fusible metal disposed between and electrically connecting said members, an electrically energizable



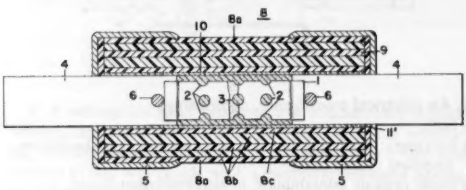
heating element adjacent to but spaced from said fusible means intermediate said ends thereof, said heating element having a pair of terminal ends at least one of which is electrically isolated from said fusible means, and means for connecting said terminal ends of the heating element to a source of electrical energy for thereby energizing said heating element and causing fusing of said fusible means.

4,124,836

ELECTRIC FUSE

Howard G. Wilks, Newbury, Mass., assignor to Gould Inc., Rolling Meadows, Ill.

Filed May 4, 1977, Ser. No. 793,514
Int. Cl.[2] H01H *85/02*
U.S. Cl. 337—186 **2 Claims**



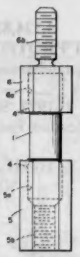
1. An electric fuse comprising
(a) a fusible element;
(b) an arc-quenching filler in which said fusible element is embedded;
(c) a pair of electroconductive terminal elements arranged at the ends of said fusible element and conductively interconnected by said fusible element;
(d) a tubular casing supporting said pair of terminal elements on the ends thereof, said casing comprising a plurality of stripes of a glass-fiber material overlapping along the longitudinal edges thereof and impregnated with polyester resin; and
(e) a lining comprising highly purified asbestos in noncarcigenous form and other insulation materials on the radially inner surface of said casing, said lining decreasing the thermal conductivity of said casing to such an extent as to be of the same order as that of a casing of vulcanized fiber or convolutely wound glass-cloth melamine, and said liner being the product known by the trademark "QUINTEX II" formerly of Johns-Manville and presently of the Quin-T-Corporation.

4,124,837

CAPACITOR FUSE AND METHOD OF MANUFACTURING A PART THEREOF

Robert J. Panaro, Byfield, Mass., assignor to Gould Inc., Rolling Meadows, Ill.

Filed Jul. 15, 1977, Ser. No. 816,156
Int. Cl.[2] H01H *85/22*
U.S. Cl. 337—251 **3 Claims**



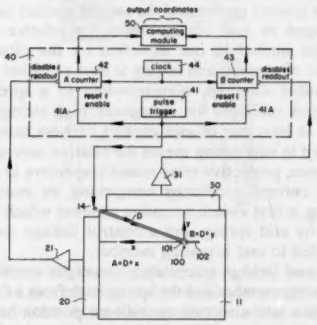
1. A capacitor fuse comprising
(a) a casing of electric insulating material, a granular arc-quenching filler inside said casing, a fusible element inside said casing embedded in said filler and a pair of ferrules conductively interconnected by said fusible element and mounted on the ends of said casing;
(b) a first externally hexagonal element having a first cylindrical cavity press-fitted by means of said cavity on one of said pair of ferrules and having an internally screw-threaded bore; and
(c) a second externally hexagonal element having a second cylindrical cavity press-fitted by means of said cavity on the other of said pair of ferrules and having an externally screw-threaded stud projecting in a direction away from said casing.

4,124,838

APPARATUS FOR POSITION DETERMINATION

William Kiss, Shelton, Conn., assignor to Science Accessories Corporation, Southport, Conn.

Filed Dec. 29, 1976, Ser. No. 755,156
Int. Cl.[2] G01S *5/18, 9/66*
U.S. Cl. 340—1 R **6 Claims**



1. Apparatus for position determination in a data space, comprisng:
first and second orthogonally oriented elongated microphones, said microphones defining adjacent edges of a substantially rectangular data space;
a passive movable element which is movable in said data space;
means for periodically generating sound waves at a source

position spaced from said movable element, said source position being located such that the sound waves emanate from about the corner of the data space defined by the intersection of said adjacent edges; and

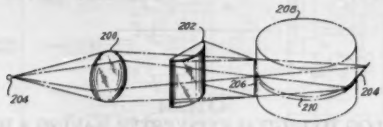
timing means coupled to said microphones and synchronized with the generation of said sound waves for measuring the transit times of the sound waves reflected off the movable element to said microphones.

4,124,839

ELECTRO-OPTICAL METHOD AND SYSTEM ESPECIALLY SUITED FOR REMOTE METER READING

Murray F. Cohen, 102 Overlook Ter., Roslyn Heights, N.Y. 11577

Filed Dec. 23, 1976, Ser. No. 753,697
Int. Cl.[2] G08C *19/00*; H04Q *9/00*
U.S. Cl. 340—151 **31 Claims**



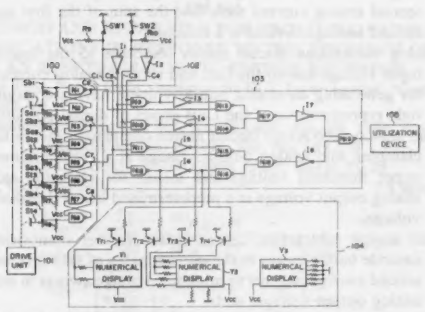
1. Apparatus comprising coding means adapted for being interrogated by electromagnetic rays along a first plane at a first station and for passing through said electromagnetic rays along a second plane angularly related to said first plane in a second station spaced from said first station, said planes intersecting generally along a line passing through both said stations, means for transmitting electromagnetic rays such that the same pass through said first plane in said first station and said second plane in said second station and form orthogonally related images respectively at said stations, and utilization means to receive the electromagnetic rays from the second station, said coding means including an encoding member adapted for the passage of said rays therethrough and having coding elements at least in opposite peripheral zones corresponding to said stations, said encoding member being provided with a channel transparent to said rays at said second station, said channel corresponding with said second plane at said second station.

4,124,840

ALARM SYSTEM

Kunimitsu Kobayashi, Yokohama, Japan, assignor to Shingo Kizai Kabushiki Kaisha, Japan

Filed May 24, 1976, Ser. No. 689,049
Claims priority, application Japan, Jan. 30, 1976, 51-8959
Int. Cl.[2] B60Q *1/54*
U.S. Cl. 340—501 **9 Claims**



1. An alarm system comprising

(a) detection means including a drive unit movable with a variation in the magnitude of a physical quantity, a plurality of detection channels each having a predetermined threshold value different from the others, each channel comprising a movable conductor operatively connected with the drive unit for movement thereby and electrically connected with the ground, a pair of stationary conductors adapted to have a control voltage applied thereto and being engageable by said movable conductor during movement of the latter, and a flipflop circuit having a pair of input terminals connected with the respective stationary conductors, said movable conductor in each channel upon being moved by said drive unit from engagement with one of the stationary conductors into engagement with the other of said pair of stationary conductors causing said flipflop circuit to produce a binary signal representative of the magnitude of the physical quanity;

(b) selection means for selecting a predetermined one of the threshold values in form of a binary signal and comprising a plurality of selection channels each associated with a detection channel of said detection means, means for applying a control voltage to each of the selection channels, and grounded switch means operatively connected with each of the selection channels for connecting a selected number thereof to ground providing thereby a binary signal representative of a selected threshold value;

(c) comparison means for comparing, as input signals thereto, an output signal of the detection means with an output signal from the selection means and producing an electrical output signal when the magnitude of the physical quantity exceeds the threshold value selected by the selection means; and

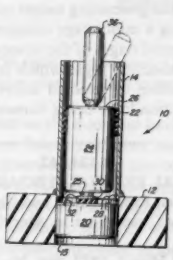
(d) a utilization device supplied with the electrical output signal from the comparison means to provide an alarm when the magnitude of the physical quantity exceeds the threshold value selected by the selection means.

4,124,841

MOTION DETECTION DEVICE

John Kettunen, 195 W. 24th St., Yuma, Ariz. 85364

Filed May 19, 1977, Ser. No. 798,665
Int. Cl.[2] G08B *13/02*
U.S. Cl. 340—690 **8 Claims**



1. An alarm for detecting motion and for emitting a signal in response to motion, said alarm comprising:

(a) a base;

(b) an electrically conductive housing supported on said base;

(c) a generally horizontal contact plate electrically insulated from said housing;

(d) a terminal spaced from said contact plate;

(e) a source of electrical energy connected to said contact plate and said terminal;

(f) signal means connected to said terminal and said housing; and

(g) a contact element positionable on said contact plate in a first position and responsive to motion and displaceable to a second position establishing an electrical circuit between

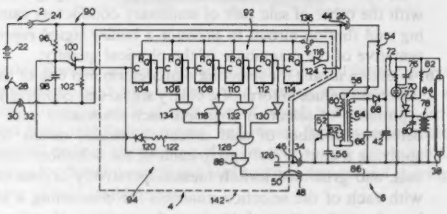
said housing and said contact plate whereby current flows to said signal means actuating same.

4,124,842

MORSE CODE SIGNALLING DEVICE

Robert Bachelor, 49 Thorncliffe Park Dr., Apt. 208, Toronto, Ontario, Canada

Filed Jan. 12, 1976, Ser. No. 648,175
Claims priority, application Canada, Jun. 13, 1975, 229320
Int. Cl.[2] G08B *5/38*; H05B *41/26, 41/34*
U.S. Cl. 340—321 **2 Claims**



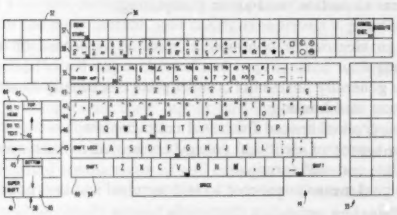
1. A battery operated signalling device, comprising a portable assembly comprising a battery, a battery casing enclosing the battery, a gas discharge tube, a capacitor connected across the discharge tube, a DC to DC converter connected to the battery and to the capacitor to charge the latter in a charge phase of an operating cycle, triggering means connected to the tube and operable to initiate discharge of the capacitor therethrough in a discharge phase of the operating cycle, first means to actuate said triggering means and thus initiate the discharge phase a predetermined interval after the commencement of the charging phase so as to render the operating cycle continuously repetitive, said first actuating means comprising an oscillator providing actuating pulses for the triggering means, second means to actuate said triggering means and thus initiate the discharge phase, said second actuating means comprising electric pulse signal generating means programmed to generate pulse signals in a predetermined repeating sequence for application to said triggering means, and switch means connected selectively to enable either one of said first and second actuating means, the signal generating means comprising a programming device having a multi-stage counter and selection logic, the outputs of selected stages of the counter being connected to the inputs of the selection logic which is arranged to provide an output in response to selected states of the counter, the output of the selection logic being connected to the triggering means.

4,124,843

MULTI-LINGUAL INPUT KEYBOARD AND DISPLAY

Harvey G. Bramson, Framingham, and Charles W. Ying, Andover, both of Mass., assignors to Atex Corporation, Bedford, Mass.

Filed May 2, 1977, Ser. No. 792,714
Int. Cl.[2] G06K *15/20*; G06F *3/14*
U.S. Cl. 340—337 **17 Claims**



1. A terminal for use by an operator of a data processing system, said terminal comprising:

A. a plurality of fixed data input keys, each said fixed data input key corresponding to a different symbol and having a visual indication of that symbol thereon, certain of the symbol constituting predetermined selectable sets of symbols,

B. a plurality of variable data input keys,

C. control means for enabling the operator to select one of the selectable sets of symbols thereby to assign to each said variable data input key a different one of the symbols in the selected set, each symbol in the selected set thereby being assigned to one key of each said fixed data input keys and said variable data input keys, and

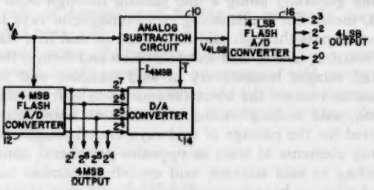
D. generating means responsive to the actuation of any of said fixed and variable data input keys by the operator for generating key identifying signals that are transferred to the data processing system.

4,124,844

ANALOG TO DIGITAL CONVERTER HAVING A HIGH SPEED SUBTRACTION CIRCUIT

Stephen R. Black, Bountiful, Utah, and Gary A. Gibbs, Mesa, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 10, 1976, Ser. No. 694,734
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 AD **3 Claims**



1. An analog digital converter for converting an analog input voltage into an MSB group and an LSB group of digital outputs at a first and a second output terminal means, respectively, comprising:

first A/D converter means for converting the analog input voltage into the MSB group of digital outputs at said first output terminal means,

D/A converter means coupled to said first output terminal means for converting the MSB group of digital outputs into a first analog current which is proportional to the magnitude of the MSB group of digital outputs and into a second analog current such that the sum of the first and second analog currents is a constant,

analog subtraction circuit means responsie to the analog input voltage and to the first and second analog currents for generating an analog output voltage having a magnitude representative of the LSB group of digital outputs,

said analog subtraction circuit means comprising means for clamping said analog output voltage at a predetermined upper threshold voltage and means for clamping said analog output voltage at a predetermined lower threshold voltage,

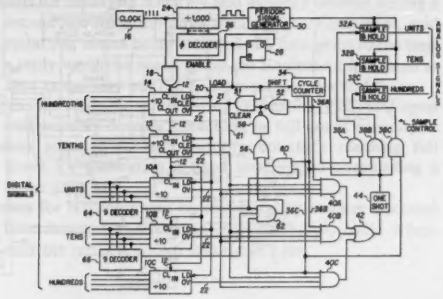
said analog subtraction circuit means further comprising cascode buffer means in the current paths of said first and second analog currents to minimize voltage swings in said analog output voltage, and

second A/D converter means coupled to said analog subtraction circuit means for converting the analog output voltage into the LSB group of digital outputs at said second output terminal means.

4,124,845
MULTIPLEXED DIGITAL/ANALOG CONVERSION OF PLURAL DIGITAL SIGNALS

Dean P. Huntsinger, Marion, and Thomas A. Pearson, Cedar Rapids, both of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 26, 1976, Ser. No. 708,787
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 DA **4 Claims**



1. A multiplexed digital/analog converter responsive to clock pulses for converting a binary coded decimal digital word to a plurality of analog signals, comprising:

a plurality of decade counters, each for receiving the digital signal for a different one of the digits of the word to control the digital count from which it begins counting the clock pulses, said digits including a predetermined digit and all digits more significant than said predetermined digit;

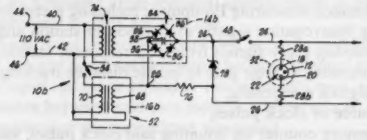
at least one common decade counter connected in cascade before each of said plurality of counters for receiving the digital signal of a digit of the word less significant than said predetermined digit to control the digital count from which it begins counting the clock pulses, and

logic circuit means for periodically enabling said common and plural counters to digitally count the clock pulses in accordance with the digital signals between a preset state determined thereby and a fixed state and sequentially converting to an analog value the individual count achieved by said plurality of decade counters in combination with said common counter, including means for clearing said common counter at the beginning of a count corresponding to a particular significant digit whenever the value of said predetermined digit and any other significant digits between it and said particular significant digit are not all equal to nine.

4,124,846
METHOD AND APPARATUS FOR PROVIDING OUTPUT INDICATIONS IN RESPONSE TO THE PRESENCE OF AN ELECTROMAGNETIC ENERGY RECEPTOR

John Fajt, Paoli, Okla., assignor to ELT Incorporated, Northfield, Ill.

Continuation-in-part of Ser. No. 681,404, Apr. 29, 1976. This application Jun. 2, 1976, Ser. No. 689,175
Int. Cl.[2] G01D *21/04;* **G08B** *13/26;* **G01R** *27/26*
U.S. Cl. 340—540 **7 Claims**



1. Proximity sensing apparatus comprising:

a glow discharge device having a pair of electrodes and an inert gas disposed between the electrodes, the gas allowing current to flow through the glow discharge device when the gas is in an ionized state, the gas being ionized when a voltage applied across the electrodes is at least equal to a predetermined breakdown voltage, and remaining in the ionized state so long as the voltage applied across the electrodes is at least equal to a predetermined maintaining voltage;

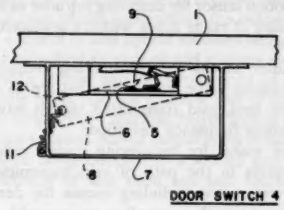
a power supply connected to the glow discharge device, the power supply applying a voltage across the electrodes at least equal to the maintaining voltage but less than the breakdown voltage; and

pulse generating means for applying a pulsed signal to each of said electrodes, said pulsed signal having a predetermined frequency from at least about 60 Hz and an amplitude from at least about 1500 volts selected to induce ionization of the inert gas in the glow discharge device when a mass is located within a predetermined positive distance of the glow discharge device, whereby current flow through the glow discharge device provides an output indication in response to the presence of the mass within the predetermined distance.

4,124,847
DOOR ALARM SYSTEM

Richard D. Cashman, Box 531, Caldwell, Id. 83605

Filed Apr. 20, 1977, Ser. No. 789,146
Int. Cl.[2] G08B *13/08*
U.S. Cl. 340—545 **2 Claims**



1. An open door alarm system for a door rotatably mounted in a door frame, said door alarm system comprising

an alarm;

a door switch mounted on the door and having a switch arm coupled to the door frame, said door switch being open when the door is closed and being moved to closed position when the door is opened at least approximately 35°, said door switch comprising a housing, an electric conductor stationarily affixed to the door in the housing, said switch arm being pivotally mounted in the housing on the door at one end thereof and having a spaced opposite second end, a spring having one end affixed to the second end of the switch arm and a spaced opposite end affixed to the housing, and a mechanical linkage from the switch arm to the door frame coupling the switch arm to the door frame in a manner whereby when the door is closed said linkage maintains said switch arm out of electrical contact with the electric conductor against the force of said spring and when the door is opened beyond approximately 35° said linkage loses its tension sufficiently to permit said spring to move said switch arm into electrical contact with said electric conductor;

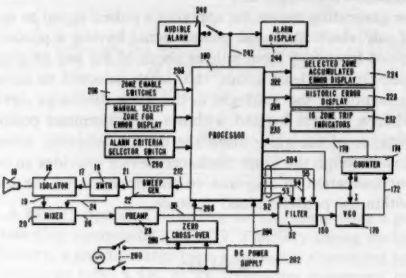
an ON-OFF switch; and

electrical conductors electrically connecting the alarm, the door switch and the ON-OFF switch in circuit to a source of electrical energy whereby when the ON-OFF switch is closed and the door is opened beyond approximately 35° the alarm is actuated.

4,124,848
RANGE LIMITED AREA PROTECTION SYSTEM

Robert V. Clark, Bethesda; Francis X. Linder, Lanham Hills, and William R. Taylor, Bethesda, all of Md., assignors to Automation Industries, Inc., Silver Spring, Md.

Filed Sep. 21, 1977, Ser. No. 835,392
Int. Cl.[2] G08B 13/18; G01S 9/24
U.S. Cl. 340—524 16 Claims



1. A motion sensor for detecting intruder motion within each of a plurality of range zones within a protected area, comprising:

transmitter means for transmitting frequency modulated continuous wave signals in a pattern to cover said protected area, said transmitted signals having a selected, repetitive frequency deviation;

receiver means for recovering signals reflected by target scatterers in the path of said transmitted signals, said receiver means including means for demodulating said received signals to produce an ensemble of audio tones, each tone representing the range of a target scatterer within said protected area;

a controllable, narrow bandpass range filter switchable between a plurality of frequency bands having predetermined center frequencies, each frequency band corresponding to a selected range zone within said protected area,

means supplying said ensemble of audio tones to said range filter, said filter passing only those tones falling within the selected frequency band so that tones at the output of said filter correspond to targets within the selected range zone;

zone control means for selecting the frequency band and thus the range zone of said range filter;

means for storing values representing the audio tones passed by said range filter for each selected range zone during a first scan of said protected area;

comparator means for comparing said stored values for each selected range zone with values representing the audio tones passed by said range filter for said selected range zones during a second scan of said protected area and for producing error signals corresponding to differences between said compared values, said error signals representing changes in the target patterns within said range zones;

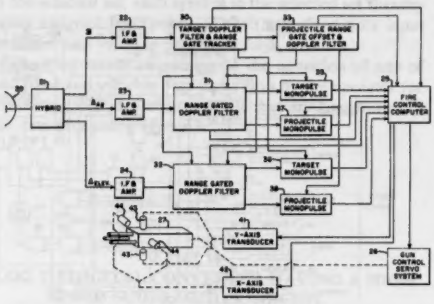
event detecting means responsive to said error signals to produce a zone trip when the change in target pattern within a zone exceeds a preselected threshold level; and

alarm means responsive to predetermined zone trip and error signal levels to produce an alarm condition indicative of an intruder within said area.

4,124,849
POSITIONING SYSTEM

Vincent T. Zahornasky, 9 Scott Ave., New Hartford, N.Y. 13413, and Nelson S. Allan, III, 2639 Edgewood Rd., Utica, N.Y. 13501

Filed Dec. 30, 1970, Ser. No. 102,804
Int. Cl.[2] G01S 9/14; F41G 3/00
U.S. Cl. 343—7 G 10 Claims



1. In a reflected wave object detection system, a system for providing inputs to a fire control computer comprising, in combination:

(a) first means providing a first range gate for enabling the reflected wave object detection system to respond to energy reflected from a target;

(b) second means providing a second range gate a preselected distance and distinguishable from said first range gate for enabling the reflected energy object detection system to respond to energy reflected from a projectile burst;

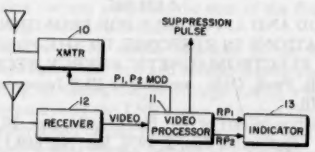
(c) means providing signals to the fire control computer indicative of velocity and position of the target; and

(d) means providing signals to the fire control computer indicative of the velocity of the projectile burst for aiming a next projectile burst.

4,124,850
VIDEO PROCESSOR FOR DISTANCE MEASURING EQUIPMENT

Richard V. Frazier, Jr., Lauderdale Lakes, and Tony Levenson, Tamarac, Fla., assignors to The Bendix Corporation, Southfield, Mich.

Filed Jun. 7, 1977, Ser. No. 804,415
Int. Cl.[2] G01S 9/02, 9/56
U.S. Cl. 343—7.3 15 Claims



1. In a video processor for Distance Measuring Equipment, said Distance Measuring Equipment including means for transmitting interrogation signals to a responser station and means for receiving reply signals from said responser station, means for positioning a range gate to enable distance tracking of said reply signals comprising,

a source of clock pulses,

a memory counter for counting said clock pulses, said memory counter having a count capacity equal to the number of clock pulses which would occur during the time required for a signal to travel round trip between a Distance

Measuring Equipment and a responser at maximum range of the Equipment,

means actuated by a reply from the responser for starting count by said memory counter during a first interrogation-reply cycle of the Equipment;

means for stopping count by said memory counter during said first interrogation-reply cycle at a time when a reply would have been received at maximum range between the Equipment and the responser;

means for restarting count by said memory counter during a second interrogation-reply cycle of the Equipment, said restarting means being actuated at a time prior to the time a reply would be received by the Equipment if located at zero range between the Equipment and the responser;

means for stopping and resetting said memory counter upon said memory counter's reaching its full count capacity;

means actuated by said memory counter's reaching full count for generating a fixed time period constituting a range gate; and

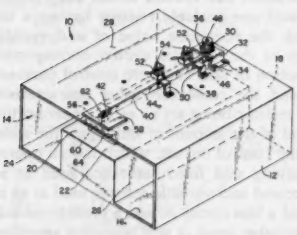
means for starting count by said memory counter a second time during said second interrogation-reply cycle whenever the reply is within said range gate.

4,124,851

UHF ANTENNA WITH AIR DIELECTRIC FEED MEANS

Bertram D. Aaron, Engineers Rd., Roslyn Harbor, N.Y. 11576, and Edwin B. Pores, 16 Dorchester Dr., Manhasset, N.Y. 11030

Filed Aug. 1, 1977, Ser. No. 820,468
Int. Cl.[2] H01Q *1/36*
U.S. Cl. 343—772 **8 Claims**



1. In a ridged-waveguide antenna for use with a transmitter to transmit radiowaves at a selected frequency, said antenna having a body, a surface on the body, an input terminal for connection to a coaxial cable and a capacitive tab for exciting the antenna, a tuneable feedline comprising:

an air-dielectric line between the input terminal and the capacitive tab to feed RF signals therebetween, said line being formed of an electrically-conductive member having an L-shaped cross-sectional configuration to provide mechanical rigidity for said line,

two fixed shunt inductors connected between said line and the antenna body, said inductors being so selected to make the input reactance of said line substantially zero, and the distance between said two inductors being related to the frequency of the transmitted wave, and

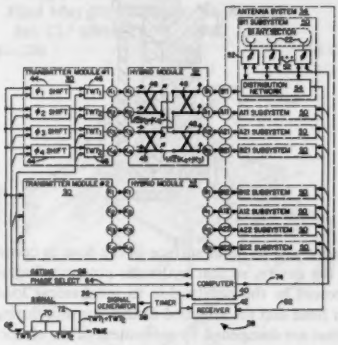
a variable capacitor in parallel with each of said inductors to enable the tuning of the antenna to the coaxial cable and the transmitter.

4,124,852

PHASED POWER SWITCHING SYSTEM FOR SCANNING ANTENNA ARRAY

Fritz Steudel, Sudbury, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jan. 24, 1977, Ser. No. 761,920
Int. Cl.[2] H01G *3/26*
U.S. Cl. 343—854 **5 Claims**



4. A system for coupling signals from a set of transmitters to a set of antenna elements comprising:

a set of four hybrid modules each of which has four input ports and four output ports, the input ports of a first and a second of said hybrid modules being coupled respectively to individual ones of said transmitters, the output ports of a third and a fourth of said hybrid modules being coupled respectively to individual ones of said antenna elements, a first pair and a second pair of output ports of said first hybrid module being coupled to a first pair of input ports respectively of said third and said fourth hybrid modules, a first pair and a second pair of output ports of said second hybrid module being coupled to a second pair of input ports respectively of said third and said fourth hybrid modules;

a set of phase shifters for shifting the signal of one transmitter relative to the signal of a second transmitter, each of said phase shifters shifting phase in increments of 90°; and wherein

each of said hybrid modules comprises a first, a second, a third and a fourth hybrid coupler, a first output port of said first and of said second hybrid couplers being connected respectively to a first input port of said fourth hybrid coupler and to a second input port of said third hybrid coupler, a second output port of said first and of said second hybrid couplers being connected respectively to a first input port of said third hybrid coupler and to a second input port of said fourth hybrid coupler.

4,124,853

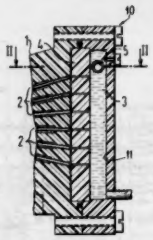
HYDRAULIC DAMPENING DEVICE IN AN INK SUPPLY SYSTEM OF AN INK OPERATED MOSAIC PRINTER UNIT

Erich Kattner, and Wilfried Kindler, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 27, 1976, Ser. No. 726,736
Claims priority, application Fed. Rep. of Germany, Sep. 29, 1975, 2543397
Int. Cl.[2] G01D *15/16*; B41J *27/00*
U.S. Cl. 346—140 R **1 Claim**

1. In a device for supplying ink to a mosaic printer unit having several printing ink jets provided in a printer head, said device having a common distributor unit to supply ink to each of the printing ink jets, the improvement comprising the com-

mon distributor unit being attached to the printer head and having a cavity being filled with the printing ink, and said cavity supplying ink directly to each of said printing ink jets and being provided with an elastic wall member comprising a hose extending into the cavity with an interior surface of the hose being in communication with the atmosphere surrounding



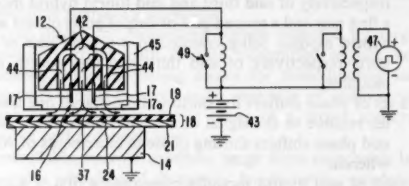
the device and an outer surface of the hose in contact with the ink in the cavity, so that hydraulic pressure fluctuation in the ink present in the cavity due to mechanical loading of the printer head and the attached distributor unit during a printing operation are dampened by movement of the elastic wall member.

4,124,854

ELECTROSTATIC RECORDER WITH A RECORDING HEAD WHICH FLOATS ON A FLUID CUSHION

Suvrat Kirtikar, Pittsburgh, Pa., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Feb. 27, 1975, Ser. No. 553,849
Int. Cl.² G03G *15/044*
U.S. Cl. 346—155 **2 Claims**



1. Electrostatic recording apparatus for recording information on a dielectric sheet comprising:

an electrostatic recorder head including a stylus having a tip;

a back-up electrode positioned in proximity to said tip;

an ionization gap adapted to receive the sheet being formed between said stylus tip and electrode;

means for selectively applying a voltage between said stylus and electrode, said voltage being of sufficient magnitude to create ionization in said gap;

means for maintaining at least a minimum predetermined gap length of 0.3 mil between said stylus and said sheet;

said maintaining means including means for producing a fluid flow between said head and said electrode to create a fluid cushion for supporting said head; and means for controlling the humidity in said ionization gap; wherein said humidity controlling means includes a source of liquid and means for applying said fluid to said source of liquid before application of said fluid between said stylus and said electrode;

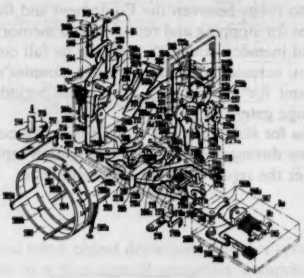
said humidity controlling means further including means for measuring the humidity of the air in said gap to derive a humidity control signal; and means responsive to the humidity control signal for mixing liquid from said source with said fluid.

4,124,855

AUTOMATIC EXPOSURE CONTROL APPARATUS AND A CAMERA HAVING THE SAME

Masanori Uchidoi, Kawasaki; Hideaki Miyakawa, Inagi; Hiroshi Aizawa, Machida; Masayoshi Yamamichi, Kawasaki; Osamu Ohshima, Tokyo, and Tokuichi Tunekawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 593,231, Jul. 7, 1975, abandoned. This application Jun. 17, 1977, Ser. No. 807,653
Claims priority, application Japan, Jul. 26, 1974, 49-85661
Int. Cl.² G03B *7/08*
U.S. Cl. 354—24 **3 Claims**



1. A photographic camera having an automatic exposure control apparatus, comprising:

a photo-sensing means to sense an object brightness, said means providing an electric signal corresponding to a logarithmically converted value of an object brightness;

an exposure adjusting means for controlling the amount of exposure of photographic film;

an exposure control parameter setting means for setting exposure control parameters other than the parameter selected by said exposure adjusting means;

a resistor means to generate an electric signal corresponding to the value set by said exposure control parameter setting means, wherein said resistor means has a fixed resistance and at least one variable resistor having a slider being grounded, the resistance value of said variable resistor being set as the slider is shifted corresponding to the setting action of said exposure control parameter setting means, and the resistance value characteristics of the variable resistor being set so as to be proportional to the reciprocal of the amount of shifting of the slider;

an electronic control circuit, which has an operational amplifier having said fixed resistance used as a feedback resistance and said variable resistor used as an input resistance, and a bias circuit to add a predetermined bias voltage to the other input of said operation amplifier, wherein said operational amplifier conducts APEX computation of the output signal of said resistor means and the output signal of said photosensing means, and wherein said exposure adjusting means is functionally coupled with said electronic control circuit and said adjusting means sets an appropriate exposure value based on the output of the operational amplifier.

4,124,856

CAMERA HAVING DUAL FILM CAPACITY

Fred P. Tarr, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 29, 1977, Ser. No. 811,082
Int. Cl.² G03B *17/50, 19/06*
U.S. Cl. 354—86 **8 Claims**

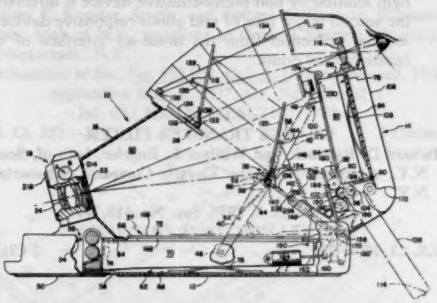
1. A camera comprising:

a first housing section including means for supporting a first film cassette in position for exposure of a film unit contained therein;

a second housing section including means for supporting a second film cassette in position for exposure of a film unit contained therein;

means for exposing either the film unit in the first cassette or the film unit contained in the second cassette;

means for coupling said first and second housing sections to each other for movement between a collapsed inoperative position and an extended operative position;



at least two reflective members mounted within said camera forming components of a viewing system; and

means for mounting said reflective members for automatic movement between viewing and nonviewing positions as said first and second housing sections are moved between said extended operative position and said collapsed inoperative position, respectively.

4,124,857

CAMERA

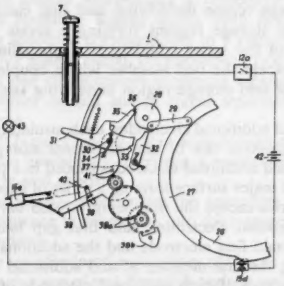
Raimund Hauser, Goldeggasse 2, 1040, Vienna, Austria, and Harald Wessner, Neunkirchen, Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Division of Ser. No. 402,745, Oct. 2, 1973, Pat. No. 4,027,317. This application Feb. 18, 1977, Ser. No. 770,233

Claims priority, application Austria, Oct. 3, 1972, 8460/72; Jun. 29, 1973, 5726/73

Int. Cl.[2] G03B *3/00, 13/02, 9/64*

U.S. Cl. 354—198 **4 Claims**



1. In a camera provided with objective means, trigger means for exposing a photosensitive element to light from said objective means, and exposure-time-setting means for selecting a desired exposure time, in combination:

indicator means operatively coupled with said exposure-time-setting means for signaling an exposure time conducive to blurring due to camera unsteadiness;

ancillary exposure-controlling means whose use reduces the risk of such blurring;

operating means for optionally activating said ancillary exposure-controlling means; and

overriding means in said housing coupled with said operating means for preventing actuation of said indicator means upon activation of said ancillary exposure-controlling means.

4,124,858

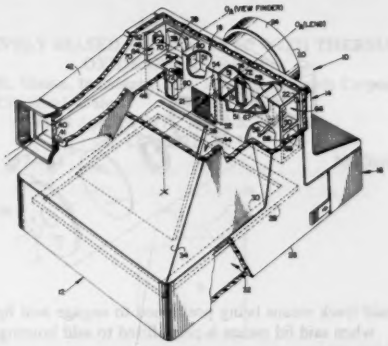
PHOTOGRAPHIC CAMERA HAVING INDEPENDENT VIEWFINDER AND REFLEX FOCUSING SYSTEM

Irving Erlichman, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 25, 1977, Ser. No. 800,197

Int. Cl.[2] G03B *19/12, 13/02, 13/08*

U.S. Cl. 354—200 **18 Claims**



1. A photographic camera comprising:

a housing including means for defining an exposure area at a focal plane in which film may be positioned for exposure;

a variable focus objective taking lens having an optical axis and mounted within said housing so that a real image of a scene to be photographed may be formed on said focal plane by said objective taking lens, said objective taking lens and said exposure area at said focal plane thus cooperating to provide a field of view for said camera;

selectively actuable means for admitting scene light from said objective taking lens to said focal plane to define a photographic exposure cycle;

viewfinder means mounted within said housing for viewing, independently of said objective taking lens, a field of view generally coextensive with said field of view of said camera, said viewfinder means facilitating the aiming of said camera to frame the subject matter to be imaged on said focal plane by said objective taking lens during said photographic exposure cycle; and

means for providing a view of part of the image formed by said objective taking lens within said viewfinder means so that a camera user may observe said part image and adjust the focus of said objective taking lens to focus said objective taking lens prior to said photographic exposure cycle and while framing the subject matter to be imaged on said focal plane by said objective taking lens.

4,124,859

MULTI-EFFECT PORTABLE CAMERA VIGNETTE

Warren Charles Huber, 939 Kensington East, Dyer, Ind. 46311

Continuation-in-part of Ser. No. 669,388, Mar. 22, 1976, abandoned. This application Mar. 16, 1977, Ser. No. 778,263

Int. Cl.[2] G03B *11/00*

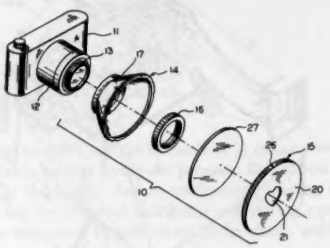
U.S. Cl. 354—296 **15 Claims**

1. In combination with a photographic instrument having an image receiving lens, a vignetter comprising:

hollow housing means having a pair of open oppositely disposed ends;

mounting means,

said mounting means positioned at the first of said ends whereby said housing means may be mounted to said lens;
externally formed lip means,
said lip means extending about the outer periphery of the second of said ends,
said lip means having formed therein detents at regular intervals about the periphery of said second of said ends;
lid means,
said lid means having formed peripherally thereon upstanding side wall means;
track means,
said track means being formed interiorly on said side wall means,



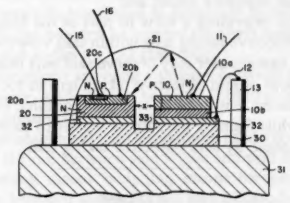
said track means being positioned to engage said lip means when said lid means is press-fitted to said housing means;
stop means,
said stop means being formed within said track means,
said stop means being spaced apart to engage said detents when said lid means is rotated with respect to said housing means,
said lid means having formed therethrough vignette aperture means,
said vignette aperture means being sized and shaped to enable passage of a selected fraction of light reflected from an image through said housing to said lens.

4,124,860

OPTICAL COUPLER

Herman D. Johnson, Dallas, Tex., assignor to Optron, Inc., Carrollton, Tex.

Continuation of Ser. No. 553,530, Feb. 27, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 669,105
Int. Cl.[2] H01L *31/12*
U.S. Cl. 357—19 **15 Claims**



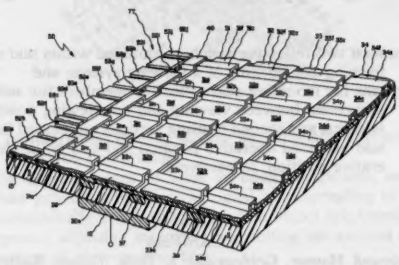
1. An optical coupler comprising
(a) at least one photo-emissive device comprising a discrete body of semiconductor material having first and second opposed major faces and at least one photo-responsive device comprising a discrete body of semiconductor material having first and second opposed major faces, the first major face of each of said bodies mounted on electrically non-conductive support means supporting the opposed edges of said bodies in close proximity but electrically isolated from each other and the second major face of each of said bodies in a common plane and facing substantially the same direction, and
(b) a substantially hemispherical dome of electrically non-conductive material substantially transparent to the operative wavelengths of said photo-emissive and photo-responsive devices disposed over and in contact with the second major faces of said devices and covering all surfaces of said devices except said first major faces; whereby light emitted by said photo-emissive device is directed to the second major face of said photo-responsive device by internal reflection from the dome-air interface of said hemispherical dome.

4,124,861

CHARGE TRANSFER FILTER

Richard D. Baertsch, and William E. Engeler, both of, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,747
Int. Cl.[2] H01L *29/78; G11C 19/28*
U.S. Cl. 357—24 **2 Claims**



1. In combination,
a substrate of semiconductor material of one conductivity type having a major surface,
means forming a charge storage region adjacent said major surface of said substrate including a first and a second electrode, each insulatingly overlying said storage region,
means for enlarging in steps the charge storage capability of said storage region by selectively coupling in steps each of a plurality of additional storage regions to the portion of said storage region underlying said first electrode, said additional storage regions forming a series with each member of the series coupling to a preceding member thereof except the first member which couples with the portion of said storage region underlying said first electrode,
a plurality of additional electrodes, each insulatingly overlying a respective one of said additional storage regions, each of said additional electrodes spaced in a plane parallel to said major surface forming a series of gaps, each gap of the series except the first being located between adjacent additional electrodes, said first gap being located between said first electrode and the additional electrode overlying the first member of said additional storage regions, the area of each additional electrode of said series being greater than the area of a preceding additional electrode of said series,
sampling means for developing a sequence of first quantities of charge, each quantity corresponding to a respective value of a series of successive values of an analog signal,
introducing means including said second electrode for introducing serially each of said quantities of charge of said sequence into said storage region,
removing means including said second electrode for removing periodically a fixed fraction less than 1 of the total of said first quantities of charge contained in said storage region to provide a sequence of second quantities of charge, said fixed fraction of charge periodically removed

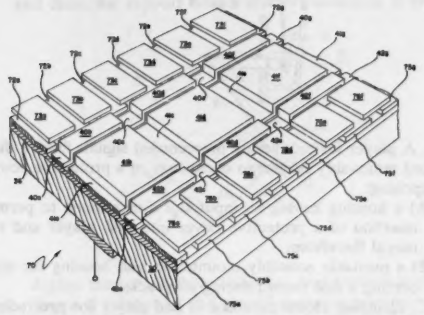
from said storage region by said removal means being determined by the ratio of the area of said second electrode overlying said substrate to the total area of said first, second electrodes and additional electrodes overlying said substrate.

4,124,862

CHARGE TRANSFER FILTER

William E. Engeler, Scotia, and Jerome J. Tiemann, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 618,838, Oct. 1, 1975, abandoned. This application Mar. 8, 1977, Ser. No. 775,662
Int. Cl.[2] H01L *29/78*; G11C *19/28*
U.S. Cl. 357—24 2 Claims



1. In combination,

a substrate of semiconductor material of one conductivity type having a major surface,

means forming a plurality of *n* first charge storage regions adjacent said major surface of said substrate including a plurality of pairs of a first and a second electrode, each pair of first and second electrodes being in insulated relationship with respect to one another and insulatingly overlying a respective first storage region in said substrate,

means for developing in succession sequences of first quantities of charge, each sequence having the same number *n* of first quantities of charge representing a respective sequence of values of a repetitive analog signal, each first quantity of charge of a sequence corresponding to a respective value of said repetitive analog signal, corresponding first quantities of charge in a pair of successive sequences representing corresponding values of said analog signal separated by a fixed period of time,

a first shift register having *n* stages, each stage comprising an electrode insulatingly overlying a second charge storage region in said substrate,

means for serially transferring the quantities of charge in each sequence in succession into the *n* stages of said first shift register,

means for transferring the quantities of charge in a sequence from each stage of said first shift register into a respective one of said first storage regions,

means for periodically dividing the total charge in each of said first storage regions into a first part in a first portion and a second part in a second portion after each transfer of a first quantity of charge into a respective first storage region and the equilibration of the resultant charge in the respective first storage region to provide a sequence of second quantities of charge, the ratio of each second part to a respective total charge being a fixed fraction less than 1, each one of said first electrodes insulatingly overlying a said first portion of one of said first charge storage regions,

a second shift register having *n* stages, each stage comprising one of said second electrodes insulatingly overlying a second portion of one of said first charge storage regions,

means for serially transferring said sequence of second quantities of charge out of said second shift register,

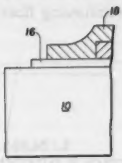
means for sensing each of said second quantities of charge from said second shift register to obtain an output signal.

4,124,863

POSITIVELY BIASED SUBSTRATE IC WITH THERMAL OXIDE GUARD RING

Donald R. Mason, Indialantic, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Apr. 12, 1977, Ser. No. 786,916
Int. Cl.[2] H01L *29/34*
U.S. Cl. 357—54 13 Claims



1. In an integrated circuit having a substrate at a predetermined positive potential, a first layer of thermally grown insulation over and in contact with said substrate, a second layer of low moisture resistant, chemically vapor deposited insulation including hydrogen ions formed over and in contact with said first layer, aluminum interconnects including at least one aluminum interconnect at a predetermined negative potential over and in contact with said first layer, spaced from the lateral edge of said first layer and separated from the said lateral edge by said second layer, and a current path between said interconnect at said negative potential and said substrate through said second layer, the improvement comprising said first layer extends laterally across the substrate in all directions a distance sufficiently greater than said second layer to prevent said current path between the interconnect at said negative potential and said substrate through said second layer.

4,124,864

PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES

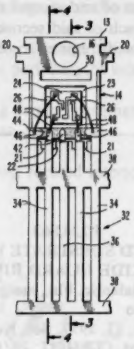
Leon S. Greenberg, Bridgewater, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 788,330, Apr. 18, 1977, abandoned. This application May 5, 1978, Ser. No. 903,119
Int. Cl.[2] H01L *23/48*
U.S. Cl. 357—70 11 Claims

1. A semiconductor device comprising a plate of electrically and thermally conductive material adapted to support a semiconductor pellet,

a plurality of leads each having an end portion adjacent to said plate, and

a body of electrically insulating material lying between at least one of said end portions and said plate and adhered to



said one end portion and said plate, said body comprising a resin having reinforcing fibers therein.

4,124,865

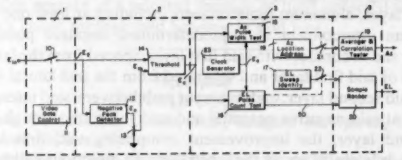
AUTOMATIC RETICLE DETECTION AND TRACKING METHOD AND SYSTEM

Robert Zwirn, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 747,747, Dec. 6, 1976, abandoned. This application Dec. 5, 1977, Ser. No. 857,621

Int. Cl.[2] H04N *7/18*

U.S. Cl. 358—126 **15 Claims**



1. A reticle locating system for discriminating between an observation scene image having a plurality of pixel location addresses associated therewith and at least one superimposed reference reticle and defining a pixel location address for the reticle wherein said observation scene image is formed by a plurality of sweeps across the observation scene to form a plurality of video signals, one video signal being formed for each sweep, said reticle locating system comprising:

(a) means for receiving and processing said video signals to form a processed signal associated with each video sweep, with a plurality of said processed signals having at least one enabling pulse period defined by a portion of the video signal having an amplitude value indicating that the video signal return is generated by said reticle;

(b) means for identifying a pixel location address for each enabling pulse period having a time duration less than a first value, and

(c) means for averaging the identified pixel location addresses in all sets of consecutive video signals having substantially correlated pixel location addresses within each set and substantially correlated pixel location addresses between sets to obtain an average pixel location address to thereby define a pixel location address for said reference reticle.

4,124,866

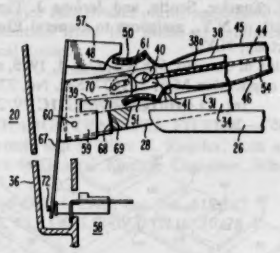
VIDEO DISC INSERTION/EXTRACTION SYSTEM FOR A VIDEO DISC PLAYER

Clyde F. Coleman, Crawfordsville, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 6, 1976, Ser. No. 747,729

Int. Cl.[2] G11B *17/04*

U.S. Cl. 358—128 **8 Claims**



1. A player for recovering prerecorded signals from a disc record removably subject to occupancy of a protective cover comprising:

(A) a housing having an input slot dimensioned to permit insertion of a protective cover into said player and removal therefrom;

(B) a turntable rotatably mounted in said housing for supporting a disc record during playback;

(C) clamping means mounted in said player for protruding into a protective cover during arrival of such a cover at a fully inserted position in said player;

said clamping means being subject to operation in a first condition and a second condition;

said clamping means, while disposed in said first condition, permitting arrival of an occupied cover at said fully inserted position;

said clamping means, while disposed in said second condition, precluding arrival of an occupied cover at said fully inserted position;

(D) means subject to engagement with a protective cover during arrival thereof at said fully inserted position in said player and responsive to each such engagement for alternating the condition of said clamping means between one of said conditions and the other of said conditions;

said clamping means, while disposed in said second condition permitting a removal of a disc record from said cover during a cover withdrawal subsequent to an occupied cover arrival at said fully inserted position in said player; and

(E) means for effecting a transfer of said removed disc record to said turntable in such manner that rotation of said removed record by said turntable may be effected thereafter with independence from said clamping means;

said transfer effecting means including guide means, subject to motion between an elevated position and a depressed position, for supporting said removed disc record in said player during occupancy of said elevated position and for releasing said removed disc record during motion thereof from said elevated position to said depressed position.

4,124,867

NARROWED-ELECTRODE PICKUP STYLUS FOR VIDEO DISC SYSTEMS

Jack S. Fuhrer, Princeton Junction, and Eugene O. Keizer, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 28, 1977, Ser. No. 782,020

Int. Cl.[2] G11B *3/44*

U.S. Cl. 358—128 **6 Claims**

1. In a playback system including a turntable for rotating a

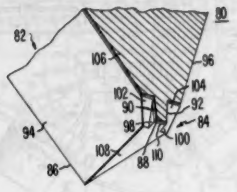
disk record having signals prerecorded along a spiral track of a given width and disposed on the surface of said record; a pickup stylus for playing back said prerecorded signals when stylus/record relative motion is established; said pickup stylus comprising:

a dielectric support element which tapers toward a tip;

said dielectric support element having an arrowhead-shape record-engaging portion in the region of said tip;

said arrowhead-shape record-engaging portion being defined by a rear edge, a pair of side edges extending substantially orthogonally from the ends of said rear edge, a pair of outwardly extending edges originating from the ends of said side edges remote from said rear edge, and a pair of edges extending from the ends of said outwardly extending edges remote from said side edges and converging at a prow;

said dielectric support element further including in said tip



region thereof a substantially flat rear surface angularly disposed relative to said record-engaging portion remote from said prow and having a pair of substantially parallel edges terminating at said ends of said rear edge;

the maximum separation between said substantially parallel edges of said angularly disposed rear surface, in the region of said tip, being less than said given track width; and

a layer of conductive material adherent to said angularly disposed rear surface between said substantially parallel edges thereof to form an electrode;

wherein said stylus is arranged in said track for playback such that, at the point of reception of said stylus, said rear edge is disposed transverse to said track and in contact therewith, said substantially orthogonally extending side edges of said record-engaging portion are disposed in the direction of said track and the movement of said record beneath said stylus reception point extends from said prow toward said rear edge.

4,124,868

HEAD CONTROL MEANS FOR OPTICAL VIDEODISC PLAYER

Roland Malissin, and Gerald Roullet, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Sep. 21, 1976, Ser. No. 725,158

Claims priority, application France, Sep. 26, 1975, 75 29606

Int. Cl.² G11B *21/04*

U.S. Cl. 358—128 **11 Claims**

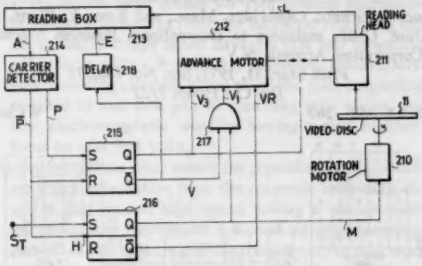
1. A process for controlling the starting and the stopping of the reading of a recording disc intended for recording information onto a spiral track, said track having at least at its beginning a blank zone free from recorded information but containing a carrier, said carrier being modulated outside said blank zone by said information, said disc being rotated in a reader comprising a reading head which operates without mechanical guiding in contact with said disc, said process comprising the successive steps of:

moving rapidly said reading head from a rest position towards the center of the disc;

detecting a signal marking said beginning of the track by detecting the presence of said carrier in said blank zone;

decelerating said reading head to a normal advance speed under the control of the detecting of said beginning;

detecting the end of said track by detecting the absence of said carrier; and



moving backward rapidly said reading head towards said rest position under the control of the detecting of said end.

4,124,869

SYSTEM FOR THE DIGITAL CLAMPING OF PERIODIC, BINARY ENCODED SIGNALS

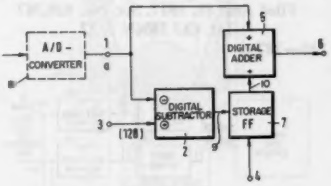
Jürgen Heitmann, Seeheim, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Jun. 21, 1977, Ser. No. 808,702

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1976, 2628662

Int. Cl.² H04N *5/16*; H04L *25/06*

U.S. Cl. 358—171 **4 Claims**



3. An apparatus for digitally clamping a binary encoded PCM video signal having a horizontal blanking interval with a preset black level value comprising:

a. a digital subtractor means for providing at its output the difference between the preset black level value and the binary encoded signal;

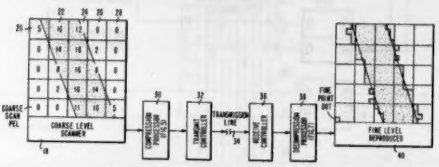
b. storage flip-flop means including an input and an output responsive to the horizontal blanking interval of the binary encoded signal, the input of said storage flip-flop means being connected to the output of said digital subtractor for transferring the difference which occurs during the horizontal blanking interval; and

c. digital adding means including inputs and an output for adding the output of said storage flip-flop means and and the binary encoded PCM video signal thereby providing at its output a digitally clamped binary encoded PCM video signal.

4,124,870
METHOD FOR IMPROVING PRINT QUALITY OF COARSE-SCAN/FINE-PRINT CHARACTER REPRODUCTION

Bruce R. Schatz, Cambridge, Mass., and Kwan Y. Wong, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,375
Int. Cl.[2] H04N 7/12
U.S. Cl. 358—260 8 Claims



1. In a method of printing a scanned image wherein scan values are obtained for each picture element of the image for reproduction at an improved print quality by activating a number of reproducing dots according to the scan value of each picture element, the improvement to the process of placing the reproducing dots activated comprising the steps of:

obtaining the scan value for picture elements surrounding the picture element to be reproduced;

calculating sums of the scan values for pattern groups of said obtained surrounding picture elements by summing the top and bottom horizontal, left and right side vertical, four corner patterns of each of three picture element scan values peripheral to the picture element being processed to obtain eight sums of three picture element scan values;

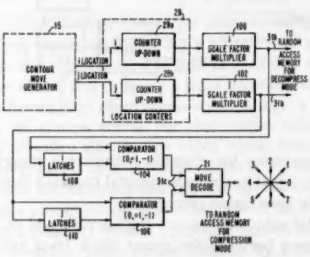
comparing the calculated sums to find the largest sums; and

biasing the activated print dots according to the largest sum found.

4,124,871
IMAGE DATA RESOLUTION CHANGE APPARATUS AND PROCESS UTILIZING BOUNDARY COMPRESSION CODING OF OBJECTS

Thomas H. Morrin, II, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1977, Ser. No. 829,387
Int. Cl.[2] H04N 1/22
U.S. Cl. 358—287 11 Claims



5. Apparatus for resolution changing objects in a black and white image from contour encoded data for storage in a bit addressable random access memory store, said apparatus comprising:

decoder means for decoding the contour encoded data into memory store coordinates identifying each picture element of the objects in the image;

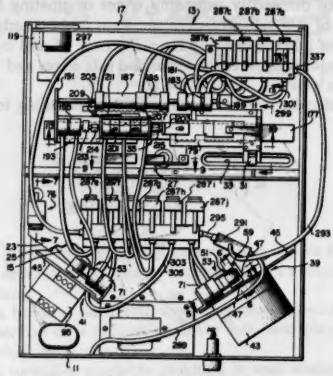
multiplier means for scale factor mutliplying the memory store coordinates; and

means for storing the image in the memory store according to the multiplied memory store coordinates of the objects in the image.

4,124,872
RECORD/PLAYBACK APPARATUS

Franklin M. Propst, 501 W. Michigan, Urbana, Ill. 61801

Continuation of Ser. No. 762,396, Jan. 26, 1977, abandoned. This application Dec. 12, 1977, Ser. No. 860,027
Int. Cl.[2] G11B 17/02, 5/016, 21/08, 5/55
U.S. Cl. 360—72 14 Claims



1. Apparatus for accessing selected sectors of one or more of a plurality of concentric circular paths on a flexible, grooveless recording disc to selectively store discrete segments of information along said paths and retrieve discrete segments of information previously stored along said paths for playback, each of said paths being divided into a corresponding number of said sectors along which a corresponding number of said discrete information segments are stored, said apparatus comprising:

means including a record/playback head for selectively storing said information segments on said disc and for selectively sensing said stored information for playback during retrieval;

means for radially positioning said record/playback head across said disc into alignment with a particular one of said paths;

means for engaging said disc adjacent the rim thereof to rotate said disc at high speed until said disc is rotationally positioned such that a selected one of said path sectors comprising said particular path is aligned with said record/playback head; and

means for engaging said disc adjacent the rim thereof after said disc is positioned to said selected path sector to rotate said disc at lower speed along one or more of said path sectors while said record/playback heat tracks said path to store said information on said disc or to play back said information from said disc.

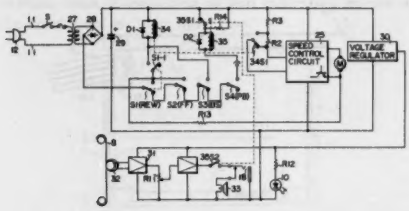
4,124,873
ELECTRIC DEVICE FOR USE IN A TRANSCRIBER

Ken Satoh, and Tuneo Yanagida, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 23, 1976, Ser. No. 707,992
Claims priority, application Japan, Jul. 24, 1975, 50-102789[U]
Int. Cl.[2] G11B 15/18, 15/48, 15/02, 19/02
U.S. Cl. 360—74 6 Claims

1. An electric device for use in a transcriber, comprising a main switch turned on or off in interlocking relation with a mechanism for setting a magnetic tape feed means and magnetic tape reproduction means of the transcriber to a position

where both means are ready to operate; a circuit for rewinding a magnetic tape at a specified speed, including a tape rewinding solenoid for moving said magnetic tape feed means to a rewinding position from said ready-for-operation position and a first switch having a first change-over contact connected to one end of a power source, a first normally closed contact and a first normally opened contact connected to the other end of said power source through said tape rewinding solenoid; a circuit for permitting said magnetic tape to run at a high speed by driving said magnetic tape feed means kept in said ready-for-operation position; a backspace circuit for energizing said tape rewinding solenoid to drive said magnetic tape feed means at a speed lower than the speed for the rewinding or high-speed running of said magnetic tape, said backspace circuit including a second switch having a second change-over contact connected to said first normally closed contact, a



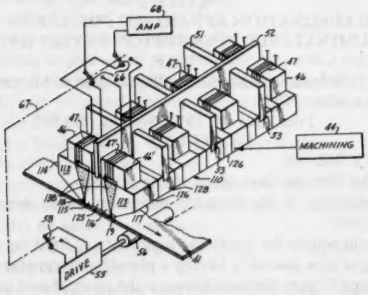
second normally closed contact and a second normally opened contact connected to said other end of said power source through said tape rewinding solenoid; a playback circuit including a playback solenoid for moving said magnetic tape feed means and magnetic tape reproduction means to respective playback positions from said ready-for-operation position and a third switch having a third change-over contact coupled to said one end of the power source through said second and first normally closed contacts and said first change-over contact, a third normally closed contact and a third normally opened contact connected to the other end of the power source through said playback solenoid; and a foot switch means for actuating said second and third switches by foot, whereby the first switch has the precedence over the second switch in operation and the second switch has the precedence over the third switch in operation.

4,124,874

MAGNETIC INFORMATION TRANSDUCER ASSEMBLY

Joel E. Zneimer, Arcadia, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Sep. 2, 1976, Ser. No. 719,747
Int. Cl.[2] G11B *5/27, 5/42*
U.S. Cl. 360—121 **2 Claims**



1. In apparatus for reproducing magnetically recorded information from a magnetic recording channel on a magnetic recording tape at a first tape speed and alternatively reproducing magnetically recorded information from the magnetic recording channel at a second tape speed, the improvement comprising in combination:

first reproduce head means for reproducing magnetically recorded information from the magnetic recording channel at said first tape speed having a first pair of matching pole pieces with a first air gap extending transversely of said recording channel, a first magnetic yoke magnetically coupled to said first pair of matching pole pieces, and a first electromagnetic winding having a first number of turns on said first yoke;

second reproduce head means for reproducing magnetically recorded information from the magnetic recording channel at said second tape speed having a second pair of matching pole pieces with a second air gap extending in parallel to said first air gap and transversely of said recording channel, a second magnetic yoke magnetically coupled to said second pair of matching pole pieces, and a second electromagnetic winding having on said second yoke a second number of turns different from said first number of turns;

a spacer element between said first and second reproduce head means; and

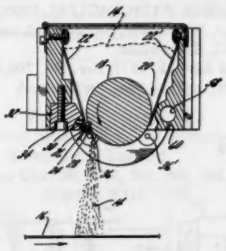
a bonding material filling said first and second air gaps and bonding said first and second pairs of matching pole pieces and said spacer element into an integral unit.

4,124,875

ELECTROSTATIC DRY DUSTING APPLICATOR

A. Conrad G. Van Zantwyk, Closter, N.J., assignor to Oxy Dry International, Inc., Roselle, N.J.

Continuation of Ser. No. 520,717, Nov. 4, 1974, abandoned, which is a continuation of Ser. No. 299,274, Oct. 20, 1972, abandoned. This application Nov. 8, 1976, Ser. No. 739,556
Int. Cl.[2] B05B *5/04*
U.S. Cl. 361—227 **9 Claims**



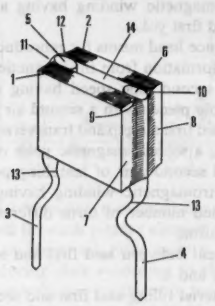
1. An electrostatic sprayer for dispensing relatively small size powder particles which comprises a receptacle for containing a quantity of said powder particles, said receptacle having an open bottom area through which powder particles may exit, a rotatable dispensing roll positioned within the open area and sized to pick up a certain amount of said powder as it rotates within the receptacle, at least one brush mounted adjacent the open area contacting the surface of the dispensing roll for restricting the amount of powder which can be carried by the surface of the dispensing roll through the open area of the receptacle, and electrostatic discharge means adjacent said dispensing roll and brush for creating an electrostatic field of the desired magnitude to remove powder particles from the dispensing roll after passing through the open area of the receptacle and to further prevent accumulation of particles in said brush.

4,124,876

DUAL MICA CAPACITOR

Xavier R. Labadie, Fresnes, and André J. Velte, Le Chesnay Parly, both of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed Oct. 18, 1977, Ser. No. 843,312
Claims priority, application France, Oct. 22, 1976, 76 31818
Int. Cl.[2] H01G *4/38*
U.S. Cl. 361—325 2 Claims



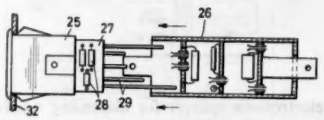
1. A capacitor comprising two electrical terminal leads and two elementary capacitors, each capacitor having a rectangular body block of stacked mica sheets including two electrode coatings of electrical conductive material covering at least two substantially parallel opposite edges of said block, said block of one elementary capacitor being connected in parallel to said block of other elementary capacitor by means of the end portions of said electrical terminal leads, said end portions being flattened and sandwiched between two main opposed faces of said blocks, projecting outward slightly beyond said substantially parallel edges of said blocks, and each being bounded in parallel to said edges of said blocks by soldering to said electrode coatings, whereby an intermediate space separates said main opposed faces of said elementary capacitor blocks.

4,124,877

AMPLIFIER WITH DIGITAL CONTROL

Max Vollenweider, Winterthur, Switzerland, assignor to Kistler Instrumente AG, Switzerland

Filed Apr. 25, 1977, Ser. No. 790,820
Claims priority, application Switzerland, Apr. 27, 1976, 005492/76
Int. Cl.[2] H05K *5/00*
U.S. Cl. 361—393 7 Claims



1. An electronic amplifier unit for mounting in a limited frontal space on a panel comprising:

a digital switch having a frontal portion containing a plurality of individual digital switching units and a back portion, said digital switch having a cross-sectional configuration conforming to an opening in the panel to allow mounting the digital switch in the panel with the plurality of individual switching units facing outward from the panel; and

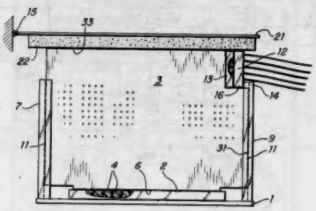
an amplifier assembly coupled to the back portion of the digital switch to form an electronic amplifier unit wherein the characteristic values of said electronic amplifier unit are set by said digital switch, and further wherein said amplifier unit has a cross-sectional configuration which also conforms to the opening in the panel so that the electronic amplifier unit can be mounted in the same opening in the panel as the digital switch alone thereby reducing the frontal space requirement of the electronic amplifier unit to the minimum necessary for mounting the digital switch.

4,124,878

INEXPENSIVE DEVICE FOR MOUNTING CIRCUIT BOARDS TO A MOTHER BOARD

Peter R. Ebner, South Nashua, and Louis E. Griffith, Hampstead, both of N.H., assignors to Itek Corporation, Lexington, Mass.

Filed May 31, 1977, Ser. No. 801,971
Int. Cl.[2] H02B *1/02*
U.S. Cl. 361—415 2 Claims



1. A device for containing a plurality of circuit boards comprising:

a. first electrical connector means of said device for attaining access to the circuitry in said plurality of circuit boards;

b. first edge guide means for receiving one stationary edge of said circuit boards;

c. second stationary edge guide means for receiving an opposite edge of said circuit boards;

d. second electrical connector means positioned upon said boards for mating with said first electrical connector means;

e. third electrical connector means positioned along an edge of said circuit boards for providing access to the circuitry of said circuit boards, said third electrical connector means being positioned along said edge to be in a blocking relationship with respect to its associated stationary edge guide means so that upon the complete insertion of the circuit boards within said device, said third electrical connector means cannot be displaced from the edge of its associated circuit board; and

f. resilient cover means for pressing against edges of said circuit boards upon closure of said cover means to maintain said circuit boards in position within said device.

4,124,879

ILLUMINATION APPARATUS FOR USE IN AN ILLUMINATABLE PUSHBUTTON KEYSET AND THE LIKE

Hans L. Schoemer, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 20, 1977, Ser. No. 799,055
Int. Cl.[2] G01D *11/28*
U.S. Cl. 362—26 9 Claims

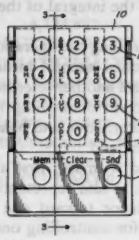
1. An illumination apparatus comprising:

a plurality of illuminatable indicating means arranged in rows;

a light source for providing a plurality of light rays;

a light pipe assembly having a plurality of transparent light pipe fingers disposed between the rows of said indicating means and having a light distributing portion connected to said light pipe fingers at one end thereof, said light source being disposed within said light distributing portion, said light distributing portion indirectly conducting light rays

from said light source to the connected ends of said light pipe fingers, said light pipe fingers providing substantially



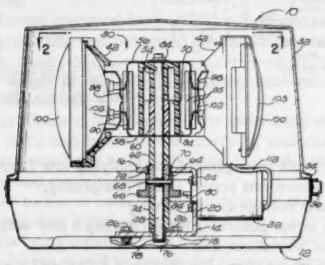
uniform back illumination of said indicating means with the conducted indirect light rays.

4,124,880

ROTATING SIGNAL LIGHT

Larry K. Dart, Costa Mesa, and Richard L. Stalder, Fountain Valley, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jun. 11, 1976, Ser. No. 695,305
Int. Cl.[2] F21M *7/00*
U.S. Cl. 362—35 11 Claims



1. A rotating signal light comprising:
a vertically disposed rotatable shaft;
motor means for rotating said shaft;
a one-piece insulative lamp holder mounted on said shaft and having a plurality of lamp receiving receptacles thereon, each said receptacle being shaped to support a lamp therein;
said lamp holder having upper and lower surfaces;
upper and lower contact plates;
said upper contact plate being mounted directly on said upper surface and said lower contact plate being mounted directly on said lower surface;
means providing a driving connection between said shaft and said lamp holder;
means providing a sliding electrical connection to said lower contact plate; and
said contact plates having spring contact fingers adjacent to said receptacles for electrically, resiliently engaging terminals on lamps in said receptacles.

4,124,881

DICE WITH ILLUMINATING MEANS

Terry M. Haber, 25721 B Taladro Cir., Mission Viejo, Calif. 92691, and Maurice M. Greeson, 17616 Jordan, #9C, Irvine, Calif. 92714

Filed Aug. 22, 1977, Ser. No. 826,355
Int. Cl.[2] F21V *33/00*
U.S. Cl. 362—253 8 Claims

1. Dice including, in combination:
(a) first and second die each having a plurality of surfaces in which opposite surfaces lie in parallel planes;
(b) light emitting means associated with each surface in each die; and
(c) energizing means for said light emitting means in each die, said energizing means including a battery in each die and gravity responsive switch means for connecting said battery to that light emitting means associated with said surface assuming a topmost position after the die has been thrown and comes to rest.

4,124,882

LIGHT SOURCE FOR MULTIPLE IMAGE PROJECTION DEVICE

Atsushi Kawamura, and Yoshio Fukushima, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 22, 1977, Ser. No. 780,209
Claims priority, application Japan, Mar. 25, 1976, 51-32740
Int. Cl.[2] F21V *7/00*
U.S. Cl. 362—300 12 Claims

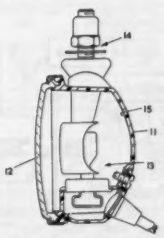
1. A light source comprising, in combination:
a reflector support member having a surface slantedly facing a target plane, the surface being formed with a plurality of steps;
a plurality of reflectors provided on the surface of the support member so as to be distributed on the steps; and
a lamp disposed adjacent to an edge of the support member spaced furthest from the target plane for radiating light onto the reflectors, the reflectors being so shaped as to reflect light from the lamp to the target plane perpendicular to the target plane, the radii of curvature and light receiving frontal areas of the reflectors being different from one another in accordance with the distances of the reflectors from the lamp and the target plane.

4,124,883

LAMP REFLECTORS

John Lilley, Shirley Solihull, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Oct. 20, 1976, Ser. No. 734,297
Int. Cl.[2] F21V *7/00*
U.S. Cl. 362—350 9 Claims

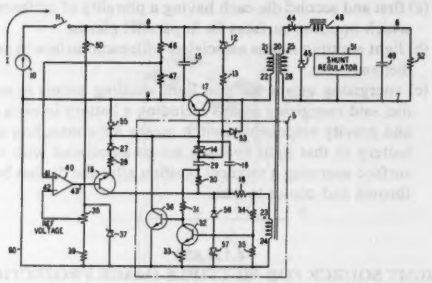


1. A lamp reflector comprising a dished body having a reflective coating on an inner surface thereof, said dished body being formed of a cured, low profile polyester moulding composition containing glass fibre and an internal mould release agent, said agent comprising a fatty acid ester.

4,124,884
DC TO DC CONVERTER WITH REGULATED INPUT IMPEDANCE

Nicholas P. Episcopo, Wayne, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 7, 1977, Ser. No. 775,175
Int. Cl.[2] H02M *3/335*
U.S. Cl. 363—21 **14 Claims**

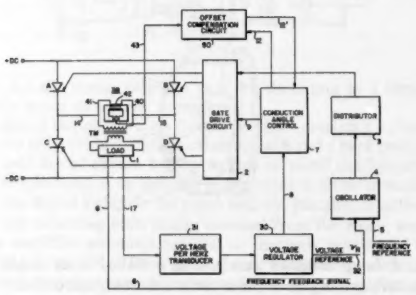


1. A power supply energized by a current source having an unstable voltage characteristic comprising:
input means for accepting a current source,
output means,
switching means for modulating a signal coupling said input means to said output means, and
sensing means for responding to a voltage magnitude coupled to said input means,
reference means for accepting a reference voltage,
comparator means coupled to respond to outputs of said sensing means and said reference means to generate a signal output as a function thereof,
driving means coupled to be responsive to the signal output of said comparator means and operatively coupled to control a duty cycle of said switching means,
said driving means including:
a timing circuit means and a charging rate control means for controlling the rate of charging of said timing circuit means, said charging rate control means coupled to and responsive to the signal output of said comparator means,
whereby a voltage magnitude at said input means is regulated.

4,124,885
OFFSET COMPENSATION FOR HARMONIC NEUTRALIZED STATIC AC GENERATOR

Craig J. Nordby, Cheektowaga, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 23, 1977, Ser. No. 780,612
Int. Cl.[2] H02M *1/18*
U.S. Cl. 363—56 **5 Claims**

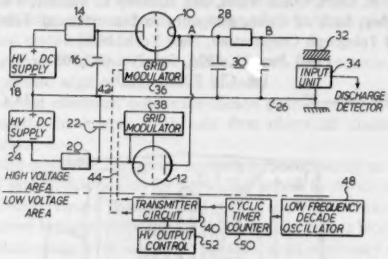


1. In a system for the generation of alternating current from a direct current power source coupled to a transformer through positive and negative inverter switches, the combination of:
means connected to said transformer for deriving a signal representative of the integral of the voltage developed in said transformer;
first means for controlling the operation of at least a selected one of said switches, second means for controlling the operation of at least another selected one of said switches, said first and second controlling means being normally operative in an alternative and balanced pattern between two polarity poles; and
means synchronized with said first and second controlling means responsive to said representative signal for detecting a flux imbalance toward one polarity pole in said transformer and for controlling one of said first and second controlling means to alter said pattern within a cycle thereof, whereby said flux imbalance is minimized.

4,124,886
GENERATION OF LOW FREQUENCY, HIGH VOLTAGES

Ian A. Black, Worthing, and Rodney Miller, St. Leonards-On-Sea, both of England, assignors to Counting Instruments Limited, Boreham Wood, England

Continuation-in-part of Ser. No. 590,710, Jun. 26, 1975, abandoned. This application Feb. 11, 1977, Ser. No. 767,733
Claims priority, application United Kingdom, Jul. 3, 1974, 29498/74
Int. Cl.[2] H02M *7/53*
U.S. Cl. 363—121 **8 Claims**



8. A circuit arrangement for applying low frequency high voltage waveforms across a load comprising,
(a) a low voltage circuit having
(i) a signal generator for producing a low voltage electrical waveform, and
(ii) a transmitter circuit having a first and a second light emitting circuit means which generate light signals representing said low voltage electrical waveform for producing a first and a second light signal,
(b) first and second light transmission means for transmitting said first and second light signals, and
(c) a high voltage circuit having
(i) first and second high voltage d.c. supply means,
(ii) a first electronic control device connected in series with said load and said first high voltage d.c. supply means such that current may flow in a first direction through said load,
(iii) a second electronic control device connected in series with said load and said second source of high voltage d.c. supply such that current may flow in a second direction through said load, said second direction being opposite from said first direction,
said first and second electronic control devices each having an electronic control means for varying the current through said first and second electronic control devices and said load in response to said first and second light signals transmitted from said first and second transmis-

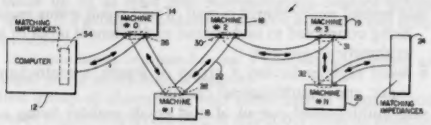
sion means to thereby regenerate said low voltage waveform at high voltage across said load.

4,124,887

REAL TIME COMPUTER CONTROL SYSTEM FOR AUTOMATIC MACHINES

Gary D. Johnson, Newark Valley; Michael M. Levie, Binghamton; Donald R. Freese, Binghamton; Robert W. Lee, Binghamton, and Eldred H. Paufve, Windsor, all of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Apr. 4, 1977, Ser. No. 784,617
Int. Cl.[2] H04Q *9/00*
U.S. Cl. 364—107 **34 Claims**



1. A system for machine control for simultaneously controlling the operation in real time of a plurality of electrically powered machines comprising:

a plurality of electrically powered machines; each of said machines including means for receiving, operating and reporting status in response to electrical commands from a computer, said machines not containing stored data to control machine operation;

a computer having access to stored data for commanding the operation of each of said plurality of machines, said commands outputted in a sequence in accordance with the program of said computer, said commands occurring in cycles of short time duration, each of said cycles including a separate command directed to each of said plurality of machines;

an undedicated electrical bus extending from said computer and transmitting said outputted commands and said status reports;

coupling means for electrically coupling each of said machines to said bus;

transmitter means at said computer for outputting said commands onto said bus, said bus carrying said commands from said computer to said plurality of machines via said bus and said coupling means;

transmitter means at each of said plurality of machines for outputting data signals from said machines onto said bus, said data being inputted to said computer via said bus;

receiving means at said computer for receiving signals from said bus;

means at each one of said plurality of machines for receiving, comparing and responding to commands on said bus addressed to that one of said plurality of machines, and for receiving, comparing and not responding to commands on said bus not addressed to that one machine,

whereby said single bus provides two-way communication between said computer and said machines, and said computer continuously commands performance and receives data from every one of said machines individually during every one of said cycles.

4,124,888

PERIPHERAL-UNIT CONTROLLER APPARATUS

Jerry R. Washburn, Alhambra, Calif., assignor to Computer Automation, Inc., Irvine, Calif.

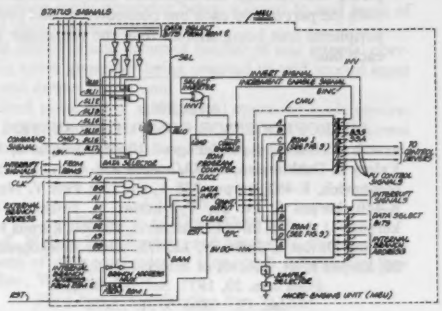
Filed Dec. 24, 1975, Ser. No. 644,341
Int. Cl.[2] G06F *3/04, 9/16*
U.S. Cl. 364—200 **26 Claims**

5. In a peripheral-unit controller having first and second signal ports, said controller being for interconnecting a peripheral unit and a digital computer for the control of data signals being transferred therebetween through said ports,

a control unit adapted to control a sequence of data signal transfer operations through said ports in accordance with control signals generated by said computer; a control device comprising:

a read-only memory unit having input lines and output lines and having a plurality of microcode words stored therein, any one of which may be applied to the output lines of said memory unit in accordance with a respective address signal applied to said input lines;

means for applying any one of at least two sets of address



signals to said input lines, one such set being transferable thereto from said output lines and the other set being transferable thereto from said computer unit;

means responsive to a select signal including a component of each microcode word supplied by said output lines for selecting one or the other of said two sets of address signals to be next transferred to said input lines; and

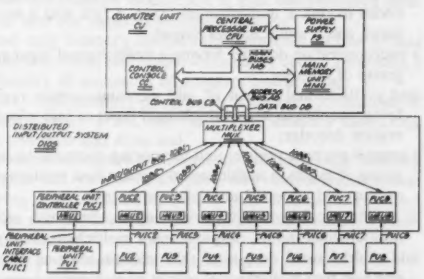
means responsive to the transferred set of address signals for generating on said output lines said one such set of address signals, such a component, and control signals for applying data signals received from said digital computer through said first port to said peripheral unit through said second port.

4,124,889

DISTRIBUTED INPUT/OUTPUT CONTROLLER SYSTEM

Phillip A. Kaufman, Irvine, and Jerry R. Washburn, Alhambra, both of Calif., assignors to Computer Automation, Inc., Irvine, Calif.

Filed Dec. 24, 1975, Ser. No. 644,412
Int. Cl.[2] G06F *3/02, 15/16*
U.S. Cl. 364—200 **25 Claims**



1. In a distributed input/output system adapted for use with a digital computer and a plurality of peripheral units having different characteristics, said peripheral units including means for generating status signals which system comprises:

a multiplexer unit adapted to be connected to said computer,

a plurality of perhipheral-unit controllers, each such peripheral unit controller being located proximate to an associated peripheral unit, each such controller having a programmed firmware device therein for generating a plurality of series of microcode control words,

means in said controller for selecting a particular series of control words in accordance with computer generated control signals and said peripheral-unit generated signals that represent the electrical status of a particular peripheral unit to which it is operatively dedicated, and

a plurality of input/output buses, each such bus interconnecting a said particular peripheral-unit with said multiplexer unti through the controller that is dedicated to it with the part of said each bus connected to said particular peripheral unit being shorter than the remainder of said each bus.

4,124,890

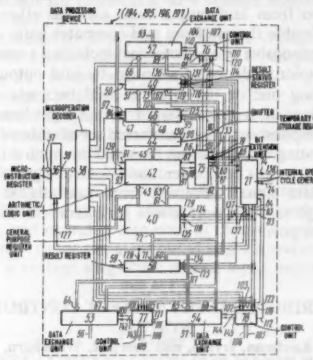
MICROPROCESSOR COMPUTING SYSTEM

Alexandr A. Vasenkov, Zelenograd 103460, korpus 3, kv. 34; Valery L. Dshkhunian, K-482, korpus 338-A, kv. 78; Pavel R. Mashevich, K-482, korpus 338-A, kv. 139; Petr V. Nesterov, K-460, korpus 3, kv. 30; Vyacheslav V. Telenkov, K-527, korpus 811, kv. 75; Jury E. Chicherin, 103460, korpus 161, kv. 31, and Davlet I. Juditsky, 125475, ulitsa Zelenogradskaya, 25, korpus 1, kv. 106, all of Moscow, U.S.S.R.

Filed Jun. 20, 1977, Ser. No. 808,119

Int. Cl.[2] G06F *9/16, 15/16*

U.S. Cl. 364—200 **22 Claims**



1. A microprocessor computing system wherein at least one data processing device is provided, each data processing device comprising:

a microinstruction register for storing microinstruction codes having a multichannel input, a first and a second input, and a multichannel output;

a microoperation decoder having a multichannel input and a group of outputs,

said multichannel output of said microinstruction register being coupled to said multichannel input of said microoperation decoder;

a general-purpose register unit for storing operands having a group of inputs, a multichannel input, a first multichannel output, and a second multichannel output;

an arithmetic/logic unit having inputs, first and second multichannel inputs, outputs, and a multichannel output,

said multichannel output of said microinstruction register and said first multichannel output of said general-purpose regisrer unit being combined and connected to said first multichannel input of said arithmetic/logic unit,

said second multichannel output of said general-purpose register unit being connected to said second multichannel input of said arithmetic/logic unit;

a temporary result storage register having a multichannel input, an input and a muitichannel output,

said multichannel output of said arithmetic/logic unit being connected to said multichannel input of said temporary result storage register;

a shifter having inputs, a multichannel input, a first output and first and second multichannel outputs,

said multichannel output of said temporary result storage register being connected to said multichannel input of said shifter;

a result status register having a group of inputs, first and second multichannel inputs, and first and second multichannel outputs,

said first multichannel output of said shifter being connected to said first multichannel input of said result status register,

said second multichannel output of said result status register being connected to said second multichannel input of said arithmetic/logic unit;

a result register having a group of inputs, a multichannel input, and a multichannel output,

said multichannel output of said result register being connected to said second multichannel input of said arithmetic/logic unit;

at least one data exchange unit having a first communication line to provide for data exchange between other sources and destinations, a multichannel input to accept result status information signals from said data processing device, a multichannel output, and a second communication line to provide for data communication between other sources and destinations,

said first multichannel output of said result status register being connected to said multichannel input of said data exchange unit,

said second multichannel output of said shifter and said multichannel output of said data exchange unit being combined and connected to said second multichannel input of said result status register, to said multichannel input of said general-purpose register unit, and to said multichannel input of said result register;

an internal operating cycle generator producing clock signals for the internal operating cycle to control data sequencing in said data processing device and having an input that receives a signal that places said data processing device in a state preceding the beginning of execution of a given instruction sequence, a trigger input, a group of inputs, a group of outputs, and a clock signal bus,

a first output of said outputs of said arithmetic/logic unit being connected to a second input of said group of inputs of said internal operating cycle generator,

a first output of said group of outputs of said internal operating cycle generator being connected to a second input of said group of inputs of said general-purpose register unit, to a second input of said group of inputs of said result status register, and to a second input of said group of inputs of said result register,

a second output of said group of outputs of said internal operating cycle generator being connected to said first input of said microinstruction register,

a third output of said group of outputs of said internal operating cycle generator being connected to said second output of said microinstruction register, to a third input of said group of inputs of said general-purpose register unit, to said input of said temporary result storage register, to a third input of said group of inputs of said result status register, and to a third input of said group of inputs of said result register,

a fourth output of said group of outputs of said internal operating cycle generator being connected to a fourth input of said group of inputs of said general-purpose register unit, to a second input of said inputs of said shifter, to a fourth input of said group of inputs of said result status register, and to a fourth input of said group of inputs of said result register,

a fifth output of said group of outputs of said internal operating cycle generator being connected to a fifth input of said group of inputs of said general-purpose register unit, to a fifth input of said group of inputs of said result status register, and to a fifth input of said group of inputs of said result register;

said outputs of said microoperation decoder being connected, respectively, to a first input of said group of inputs of said general-purpose register unit, to a first input of said inputs of said arithmetic/logic unit, to a first input of said inputs of said shifter, to a first input of said group of inputs of said result status register, to a first input of said group of inputs of said result register, and to a first input of said group of inputs of said internal operating cycle generator;

said microprocessor computing system also includes at least one group of control elements to constitute a control level made up of at least one microprogram control device which is a group of first-order control elements and comprises:

at least one input register having a multichannel input, an input and a multichannel output,

a first group of channels of said multichannel input of said input register receiving instruction codes from an external source and constituting an instruction code input of said group of first-order control elements,

a second group of channels of said multichannel input of said input register receiving result status information and constituting a result status information input of said group of first-order control element,

said result status information input of said group of first-order control elements being connected to one of said communication lines of said at least one data exchange unit of said data processing device;

a programmable address unit having an input, a group of multichannel inputs, an output, and a multichannel output,

said multichannel output of each of said input registers being connected to one of said multichannel inputs of said group of multichannel inputs of said programmable address unit;

a microinstruction storage unit having an input, a multichannel input, an output and a group of multichannel outputs,

said multichannel output of said programmable address unit being coupled to said multichannel input of said microinstruction storage unit,

said output of said programmable address unit being coupled to said input of said microprogram storage unit;

a feedback register having a first and second input, a multichannel input and a multichannel output,

a second multichannel output of said group of multichannel outputs of said microinstruction storage unit being connected to said multichannel input of said feedback register,

said multichannel output of said feedback register being connected to one of said multichannel inputs of said group of multichannel inputs of said programmable address unit;

a microinstruction register having an input, a multichannel input, and multichannel output,

a first multichannel output of said group of multichannel outputs of said microinstruction storage unit being coupled to said multichannel input of said microinstruction register;

an output driver unit having a first input, a second input, a multichannel input, a trigger output, which is the trigger output of said group of first-order control elements, and a multichannel output, which is the multichannel output of said group of first-order control elements,

said multichannel output of said microinstruction register being coupled to said multichannel input of said output driver unit,

said multichannel output of said group of first-order control elements being connected to said multichannel input of said microinstruction register of said data processing device,

said trigger output of said group of first-order control elements being connected to said trigger input of said internal operating cycle generator of said data processing device;

an internal operating cycle generator which produces clock signals for the internal operating cycle to control data sequencing in said microprogram control device and having an input to accept a signal that places said device in a state preceding the beginning of execution of a given instruction sequence, a trigger input, a group of inputs, a group of outputs, and at least one clock signal bus,

said output of said microprogram storage unit being coupled to a first input of said group of inputs of said internal operating cycle generator,

a first output of said group of outputs of said internal operating cycle generator being coupled to said input of said programmable address unit,

a second output of said group of outputs of said internal operating cycle generator being coupled to said input of said microinstruction register,

a third output of said group of outputs of said internal operating cycle generator being coupled to said second input of said output driver unit,

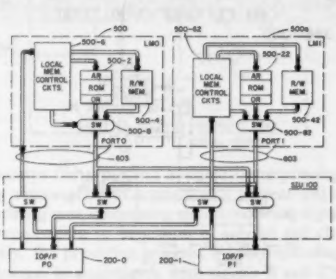
said clock pulse bus of said internal operating cycle generator being coupled to said clock pulse bus of said internal operating cycle generator of said data processing device.

4,124,891

MEMORY ACCESS SYSTEM

Edward F. Weller, III, Glendale, and Marion G. Porter, Phoenix, both of Ariz., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Nov. 18, 1976, Ser. No. 742,814
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—200 **27 Claims**



1. An input/output system for controlling input/output operations involving a plurality of input/output devices, said system comprising:

system interface means having a plurality of interface ports;

a plurality of modules, each having an interface port and including means for generating commands to said system interface means along said port, said modules including at least one memory module and at least one processor module, said one memory module including:

a read only memory operatively connected to one of said interface ports, said read only memory coded for storing a plurality of sequences of program instructions;

a read/write memory operatively connected to said one of said interface ports, said read/write memory for storing instructions and data; and,

control circuit means connected to said read only memory and to said read/write memory, said control circuit means being operative in response to said commands received from said processor module to enable said read only memory and read/write memory; and,

said one processor module including:

process control register means, including a number of bit positions for storing control information required for processing instructions of a current program under execution, a predetermined one of said bit positions for designating when said read only memory is to be accessed;

microprogrammed control means for storing sequences of microinstruction words for generating control signals for directing the operation of said one processor module;

address control means coupled to said microprogrammed control means for generating in response to said control signals address and coded identification information included as part of each of said commands transferred to said port to be used for accessing said memory module; and,

logic means coupled to said process control register means and to said address control means, said logic means being conditioned by the content of said predetermined one of said process control bit positions to modify said coded identification information received from said address control means for each generated memory command in accordance with the coding of said predetermined process control bit; and,

said control circuit means being conditioned by said modified coded identification information of said each command to enable selective switching between said read only memory and read/write memory.

4,124,892

DATA PROCESSING SYSTEMS

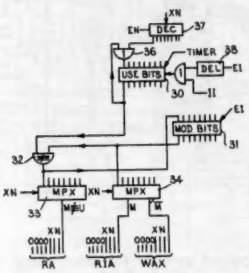
John A. Jones, Stockport, and Brian J. Procter, Hyde, both of England, assignors to International Computers Limited, London, England

Filed Mar. 17, 1977, Ser. No. 778,478

Claims priority, application United Kingdom, Mar. 18, 1976, 10865/76

Int. Cl.[2] G06F *11/00, 13/00*

U.S. Cl. 364—200 **3 Claims**



1. A working store arrangement for a data processor operable to execute a plurality of sequences of instructions, some of which specify write accesses and some of which specify read accesses to the store, the arrangement comprising:

(a) a store having a plurality of pairs of locations;

(b) indicating means associated with each pair of locations and operative to indicate which location of that pair is to be used for write accesses and which location of that pair is to be used for read accesses;

(c) means responsive to an instruction specifying a read access for selecting one of the pairs of locations and for reading from the location of that pair which is indicated by the associated indicating means as the location which is to be used for read access;

(d) means responsive to an instruction specifying a write access for selecting one of the pairs of locations, writing to the location of that pair which is indicated by the associated indicating means as the location which is to be used for write accesses, and setting that indicating means to indicate that read accesses are now to take place to the location of that pair which is currently indicated for write accesses;

(e) means operable periodically for setting each indicating means to indicate that write accesses are now to take place to the opposite location of the pair to that which is currently indicated for read accesses, and

(f) means responsive to an interrrupt signal for setting each indicating means to indicate that read accesses are now to take place from the opposite location of the pair to that which is currently indicated for write accesses.

4,124,893

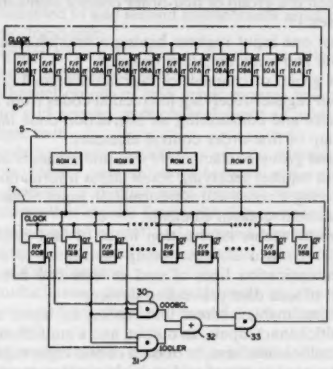
MICROWORD ADDRESS BRANCHING BIT ARRANGEMENT

Thomas F. Joyce, Burlington, and Michel M. Raguin, Medford, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Oct. 18, 1976, Ser. No. 733,558

Int. Cl.[2] G06F *9/12, 9/20, 13/00*

U.S. Cl. 364—200 **5 Claims**



1. A data processing system comprising:

at least one read only memory (ROM) for storing a plurality of microprograms, coupled to a ROM address register storing bits representative of a ROM address location, each microprogram comprising a plurality of microwords, said plurality of microwords comprising a first group of microwords and a second group of microwords, each microword of said first group having a plurality of coded bits designating a branch address for storing in said ROM address register, and said second group having at least two microwords each having a bit in a predetermined bit position for incrementing by a predetermined amount said ROM address register when said bit in said predetermined position is a binary ONE and a particular bit position in said ROM address register is a ZERO by said binary ONE, replacing said ZERO;

a ROM local register (RSLR) coupled to said ROM for storing one of said plurality of microwords from said ROM address location during a first cycle of operation;

said RSLR further coupled to said ROM address register for storing said branch address in said ROM address register during a second cycle of operation when one of said plurality of microwords of said first group is stored in said RSLR;

decoding means coupled to said RSLR and responsive to a plurality of bits stored in said RSLR for detecting said one of at least two microwords of said second group when one of said plurality of microwords of said second group is stored in said RSLR; and

ANDing means coupled to said decoding means, said RSLR and said ROM address register, being responsive to said binary ONE bit stored in said predetermined position of said RSLR, and being further responsive to said decoding means detecting said one of at least two microwords of said second group and incrementing said ROM address register by said predetermined amount during said second cycle of operation when said particular bit position in said

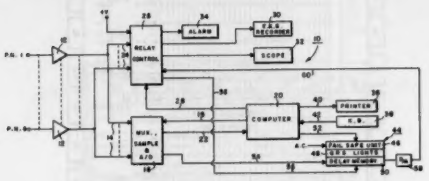
ROM address register contains said ZERO by replacing said ZERO by said binary ONE.

4,124,894

APPARATUS AND METHOD FOR REPORTING DETECTED ERROR IN A CARDIAC SIGNAL

Howard A. Vick, Pearland, and Donald B. Johnson, Houston, both of Tex., assignors to Hycel, Inc., Houston, Tex.

Continuation of Ser. No. 515,106, Oct. 15, 1974, abandoned.
This application Apr. 27, 1977, Ser. No. 791,557
Int. Cl.[2] G06F *15/42*; A61B *5/04*
U.S. Cl. 364—417 **6 Claims**



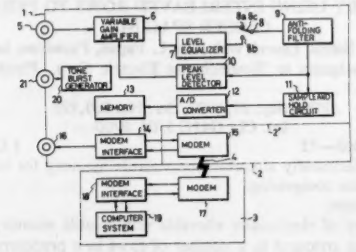
1. In an electrocardiac monitoring apparatus including means for generating limits for signals indicative of parameters which are functions of an electrocardiac waveform and means indicating an error condition when sampled signals of subsequently measured waveforms indicate measured parameters outside of the limits, the improvement for reporting error conditions comprising: utilization means for displaying a selected error message uniquely corresponding to an error code signal, computer means for producing error code signals in response to and uniquely corresponding to a type of error condition, storage means for storing a current error code signal, and means connected to said utilization means for causing said utilization means to provide an error message corresponding to the current error code signal, further means in said storage means for storing error code signals during provision of the error message in said computer means for clearing the current error code signal and providing to said storage means a next error code signal in the position of said current error code signal, whereby said utilization means may provide error messages indicative of all error code signals.

4,124,895

ACOUSTIC MEASURING SYSTEM

Tadashi Takise, Hino; Keisuke Sekiguchi, Yokohama, and Takeshi Matsudaira, Kamakura, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 30, 1977, Ser. No. 783,061
Claims priority, application Japan, Mar. 31, 1976, 51-36812
Int. Cl.[2] G01N *29/00*; G10K *11/00*
U.S. Cl. 364—514 **12 Claims**



1. A remote terminal for use in an acoustic measuring system comprising:

(a) a signal generating means for generating a reference signal,

(b) an input connector supplied with an analog signal to be measured corresponding to said reference signal,

(c) an amplifying means for preamplifying said analog signal,

(d) analog-to-digital converter means for converting said analog signal to a digital signal,

(e) memory means; and

(f) an input/output port suitable for bidirectional communication with a remote analyzing device;

said input connector being connected to said amplifying means;

said amplifying means being connected to said analog-to-digital converter means;

said memory means being connected to said analog-to-digital converter means and operative to store digital signals generated by said analog-to-digital converter means;

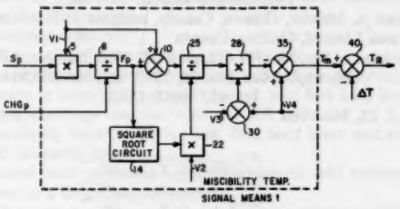
said input/output ports being connected to said memory means.

4,124,896

MISCIBILITY TEMPERATURE SIGNAL MEANS

Robert A. Woodle, Nederland, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 7, 1976, Ser. No. 730,488
Int. Cl.[2] G01N *25/00*; C10G *21/00*
U.S. Cl. 364—557 **6 Claims**



1. Apparatus for providing a signal corresponding to the miscibility temperature of a mixture of solvent and oil for a solvent refining unit, comprising means receiving signals S and CHG corresponding to flow rates of solvent and charge oil, respectively, for providing a signal F, corresponding to the solvent dosage, in accordance with signals S and CHG; and means connected to the F signal means for providing a signal T_M, corresponding to a miscibility temperature of a mixture of solvent and oil in accordance with signal F.

4,124,897

COMPENSATION SYSTEM FOR A MAGNETIC COMPASS

Willie E. Martin, Garland, Tex., assignor to E-Systems, Inc., Dallas, Tex.

Filed Apr. 1, 1977, Ser. No. 783,697
Int. Cl.[2] G01C *17/38*
U.S. Cl. 364—571 **8 Claims**

6. A compensation system for a magnetic compass utilizing a Hall effect generator wherein said Hall effect generator comprises mutually perpendicular heading and transverse elements, including:

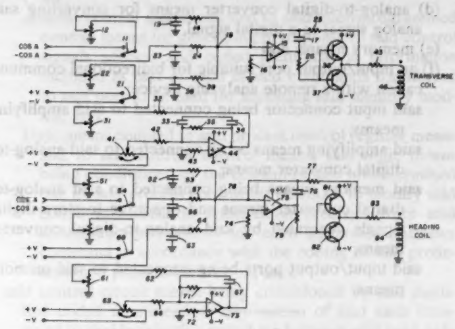
(a) a heading compensation coil encircling said heading element,

(b) a transverse compensation coil encircling said transverse element,

(c) a first compensation driver for generating a flow of current through said heading compensation coil to create a magnetic field surrounding said coil having a magnitude equal to but opposite in direction of local magnetic field components other than the earth's horizontal magnetic field, and

(d) a second compensation driver for generating a flow of current through said transverse compensation coil to

create a magnetic field surrounding said coil having a magnitude equal to but opposite in direction of local mag-



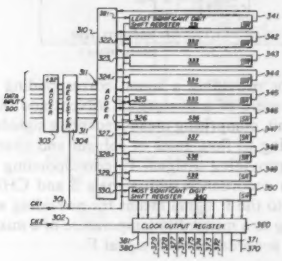
netic field components other than the earth's horizontal magnetic field.

4,124,898

PROGRAMMABLE CLOCK

Ernst A. Munter, Ottawa, Canada, assignor to Northern Telecom Limited, Quebec, Canada

Division of Ser. No. 717,618, Aug. 25, 1976, Pat. No. 4,076,965.
This application Jun. 10, 1977, Ser. No. 805,314
Int. Cl.[2] G06F *15/20*
U.S. Cl. 364—703 **1 Claim**



1. A clock circuit for generating a plurality of clock signals corresponding to a plurality of associated instruction words and a master clock signal having a predetermined pulse repetition frequency, the clock circuit comprising:

adder means having first inputs for sequentially receiving the plurality of associated instruction words, *n* second inputs and *n* outputs;

n shift registers, each connected between one of the *n* outputs and an associated one of the *n* second inputs, each shift register having a plurality of stages and each shift register being responsive to the master clock signal to shift bits therethrough, one of the shift registers being connected between the most significant output and the most significant second input of the adder means, said shift register being the most significant shift register;

an output register having inputs connected to each of the stages of the most significant shift register, the output register being responsive to a second clock signal occurring at a rate of the pulse repetition frequency of the master clock signal divided by the number of stages in the most significant shift register;

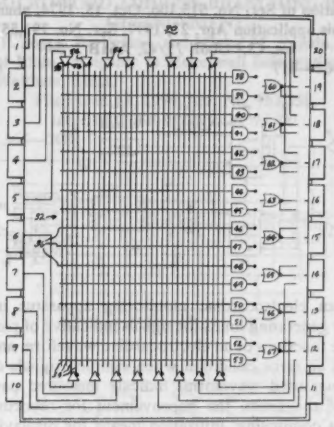
whereby a plurality of clock signals corresponding to the plurality of associated instruction words is generated.

4,124,899

PROGRAMMABLE ARRAY LOGIC CIRCUIT

John M. Birkner, Santa Clara, and Hua-Thye Chua, Cupertino, both of Calif., assignors to Monolithic Memories, Inc., Sunnyvale, Calif.

Filed May 23, 1977, Ser. No. 799,509
Int. Cl.[2] H03K *19/20*
U.S. Cl. 364—716 **21 Claims**



1. A programmable integrated logic circuit array comprising:

(a) a plurality of groups of logical AND gates;

(b) a plurality of logical OR gates;

(c) non-programmable connections between the outputs from all of the AND gates within each of said groups of AND gates to inputs of predetermined and select individual ones of the logical OR gates;

(d) a matrix of electrical conductor lines comprising

(i) input lines, and

(ii) AND gate input lines for each of the AND gates within said plurality of groups of logical AND gates; and

(e) means for selectively connecting input lines and AND gate input lines to program a desired logical output from said OR gates.

4,124,900

MEMORY USING INTERLEAVED ROWS TO PERMIT CLOSER SPACING

Philip C. Smith, Laurel, and John L. Fagan, Pasadena, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1977, Ser. No. 837,791
Int. Cl.[2] G11C *5/06, 8/00*
U.S. Cl. 365—72 **2 Claims**

1. an electrically alterable non-volatile memory for storing information comprising:

a substrate,

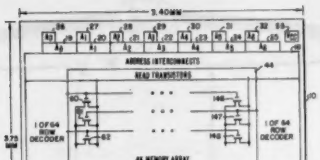
an array of electrically alterable non-volatile memory elements arranged in a number of rows in a predetermined area on said substrate,

said rows being colinear and parallel to one another and extending to a first and second side of said area, a first group of at least two rows interleaved between a second group of at least 3 rows,

said memory elements of each row of said first and second groups coupled to a conductor running along each row,

first decode logic coupled to said conductors of said first group of rows on said first side of said area for selecting one of said rows in response to a number of predetermined addresses,

second decode logic coupled to said conductors of said second group of rows on said second side of said area for selecting one of said rows in response to a number of predetermined addresses, and



means coupled to said array of memory elements for clearing said array of memory elements to a first predetermined threshold voltage,

means coupled to said array of memory elements for writing selected memory elements to a second predetermined threshold voltage, and

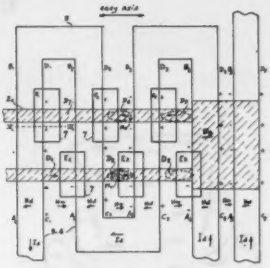
means coupled to said array of memory elements for reading selected memory elements.

4,124,901

DOMAIN PROPAGATION REGISTER WITH SINGLE LAYER OF CONDUCTORS

Claude Battarel, Magagnosc, France, assignor to Crouzet, Paris, France

Filed Mar. 22, 1977, Ser. No. 779,996
Claims priority, application France, Apr. 1, 1976, 76 09767
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—88 **4 Claims**



1. A register for propagating, under the action of electric current, magnetic domains in a channel formed by an anisotropic soft magnetic layer deposited on an insulator substrate, said registor comprising:

an insulator substrate;

a soft magnetic layer overlying the substrate;

a first hard magnetic layer overlying said soft magnetic layer except in areas defining said channel, said first hard layer being exchange coupled with said soft layer;

an insulating layer overlying said first hard layer and said soft magnetic layer;

a second hard magnetic layer disposed on said insulator layer in a Greek border pattern;

a shift conductor layer in a Greek border pattern overlying said second hard magnetic layer; and

an extra-thickness conductor laterally overlying said shift conductor layer on an input side of said Greek border pattern.

DESIGNS

NOVEMBER 7, 1978

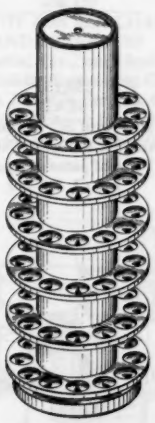
250,146
KNIT SHIRT
Peter W. S. Morgan, Keighley, England, assignor to Dunlop Limited, London, England
Filed Jul. 7, 1975, Ser. No. 593,492
Claims priority, application United Kingdom, Jan. 15, 1975, 969416/75
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—44

250,147
SHOE SOLE
Johann Waltl, Grub 1, A-6391 Fieberbrunn, Tirol, Austria
Filed Aug. 11, 1976, Ser. No. 713,572
Claims priority, application Austria, Feb. 16, 1976, 1077/76; Feb. 20, 1976, 11704/76; Feb. 20, 1976, 11709/76
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—319

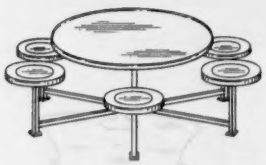
250,148
TOOTHBRUSH
Percy H. Hill, and John G. Kreifeldt, both of Winchester, Mass., assignors to Johnson & Johnson, New Brunswick, N.J.
Filed Feb. 7, 1977, Ser. No. 765,437
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—25

250,149
CRADLE
Frances E. Smith, 701 Belt Ct., Tampa, Fla. 33612
Filed Dec. 6, 1976, Ser. No. 747,614
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—15

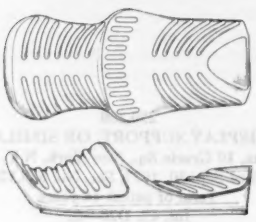
250,150
JEWELRY DISPLAY SUPPORT, OR SIMILAR ARTICLE
Victor W. Ganz, 10 Gracie Sq., New York, N.Y. 10028
Filed Sep. 30, 1977, Ser. No. 838,123
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—24



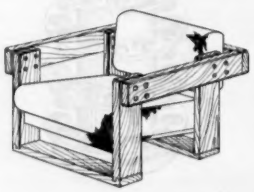
250,151
COMBINED TABLE AND MULTIPLE STOOL UNIT
James A. Pingel, 1411 River Mill Row, Beacon Woods, New Port Richey, Fla. 33568
Filed Apr. 29, 1977, Ser. No. 792,480
Term of patent 14 years
Int. Cl. D6—*05*
U.S. Cl. D6—45



250,152
VEHICLE SEAT
David C. Blocksom, 2361 NW. Johnson, Portland, Oreg. 97210
Filed Jan. 12, 1977, Ser. No. 758,650
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D6—48.1

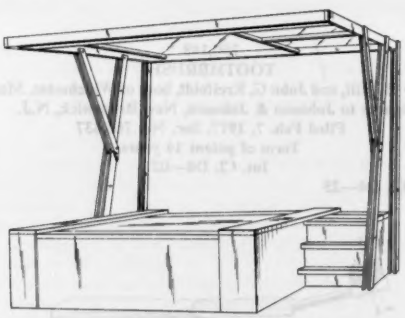


250,153
SEAT
Monte Alpert, 44 Farnsworth St., Boston, Mass. 02210
Filed Apr. 21, 1977, Ser. No. 789,429
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

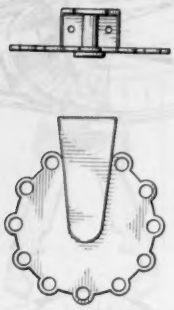


250,154
CHAIR
Roland A. Benoit, Danielson, Conn., assignor to InterRoyal Corporation, New York, N.Y.
Filed Oct. 15, 1976, Ser. No. 732,679
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—73

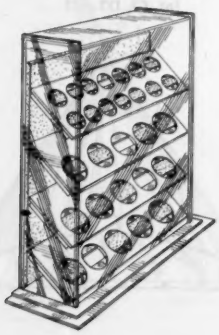
250,155
BED
Ronald T. Canagata, 131-02 224th St., Laurelton, N.Y. 11321
Filed Sep. 27, 1976, Ser. No. 727,152
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—84



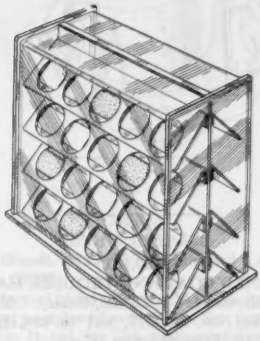
250,156
SCARF HOLDER
Eddie Tafoya, 518 Chapman Ct., Santa Clara, Calif. 90505
Filed Jan. 7, 1977, Ser. No. 757,742
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—116



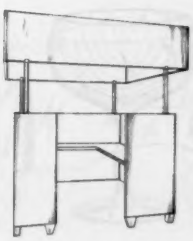
250,157
JEWELRY DISPLAY CASE
Maxine Kelly, New York, N.Y., assignor to Ciani, Inc., New York, N.Y.
Filed Mar. 21, 1977, Ser. No. 779,398
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—172



250,158
JEWELRY DISPLAY CASE
Maxine Kelly, New York, N.Y., assignor to Ciani, Inc., New York, N.Y.
Filed Mar. 21, 1977, Ser. No. 779,399
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—172

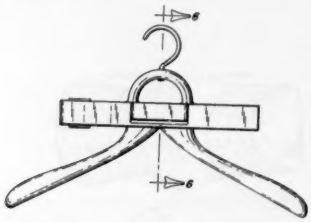


250,159
SELF-SERVICE UNIT FOR MERCHANDISING FOOD AND BEVERAGES
Albert E. Pool, Arlington, Tex., and Lloyd J. Lewis, Decatur, Ga., assignors to Modular Engineering Corp., Atlanta, Ga.
Filed Jun. 23, 1976, Ser. No. 699,175
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—181



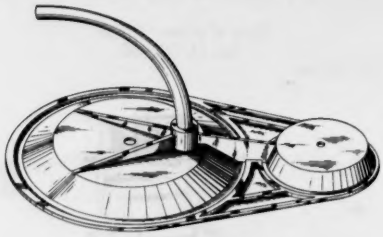
250,160
PICTURE FRAME
John E. O'Neill, Teal House, 34 Broad St., Penryn, Cornwall, England
Filed Jan. 14, 1977, Ser. No. 759,555
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—241

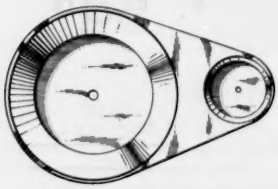
250,161
COMBINED COAT AND TROUSER HANGER
William A. Fullarton, 155 S. Drexel, Bexley, Ohio 43209
Filed Nov. 23, 1977, Ser. No. 854,122
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—253



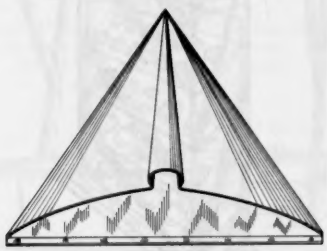
250,162
GOBLET
Carl G. Eneroth, Ringvagen 17, 181 33 Lidingo, Sweden
Filed Jul. 30, 1976, Ser. No. 710,246
Claims priority, application Sweden, Feb. 23, 1976, 76410
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—13

250,163
TRAY
Paul I. Pinson, Rte. 3, Winnsboro, Tex. 75494
Filed Aug. 11, 1976, Ser. No. 713,389
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—19



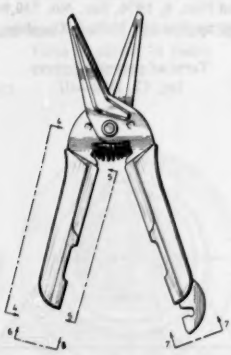


250,164
DUST PAN
John A. Speidel, 7205 Kings Mills Rd., Maineville, Ohio 45039
Filed Apr. 4, 1977, Ser. No. 783,975
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—186

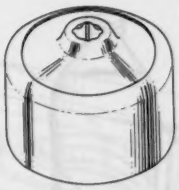


250,165
CUTTING TOOL
Peter O. Davies, Auckland, New Zealand, assignor to Tullen Industries Limited, Auckland, New Zealand
Filed Nov. 8, 1976, Ser. No. 739,741
Claims priority, application New Zealand, May 7, 1976, 14481; May 7, 1976, 14482
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—5

250,166
CUTTING TOOL
Peter O. Davies, Auckland, New Zealand, assignor to Tullen Industries Limited, Auckland, New Zealand
Filed Dec. 28, 1976, Ser. No. 755,044
Claims priority, application New Zealand, Jun. 28, 1976, 14580; Nov. 2, 1976, 14755
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—5

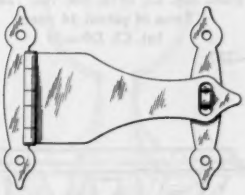


250,167
WRENCH SOCKET
Tito R. D'Oporto, Costa Mesa, Calif., assignor to Ingersoll-Rand Company, Princeton, N.J.
Filed Jan. 7, 1977, Ser. No. 757,641
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—29



250,168
SPOUT OPENER
Michael W. Brandt, 1111 W. Mockingbird La., Suite 1147, Dallas, Tex. 75247
Continuation-in-part of Ser. No. 654,353, Feb. 2, 1976, Pat. No. D. 246,222, and a continuation-in-part of Ser. No. 664,887, Mar. 8, 1976, Pat. No. D. 246,568. This application Aug. 19, 1976, Ser. No. 715,702
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—40

250,169
COMBINED HASP AND STAPLE
John Shenuski, Terryville, Conn., assignor to Woodland Machine & Die Company, Pequabuck, Conn.
Filed May 5, 1977, Ser. No. 794,121
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—336

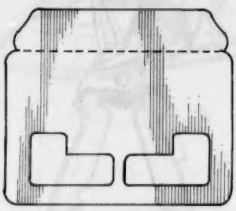


250,170
BOTTLE
Gordon A. Strand, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Oct. 14, 1976, Ser. No. 732,258
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—100

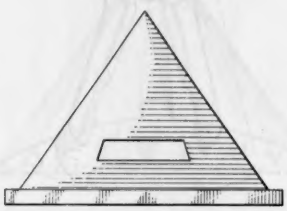
250,171
PILLBOX
Noboru Yoshimoto, Kyoto, Japan, assignor to Morishita Jintan Co., Ltd., Osaka, Japan
Filed Dec. 6, 1976, Ser. No. 747,825
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—223

250,172
PACKAGING CONTAINER FOR FOOD
Andrew G. Retelny, Wheaton, Ill., assignor to McDonald's Corporation, Oak Brook, Ill.
Filed Sep. 27, 1976, Ser. No. 726,925
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—237

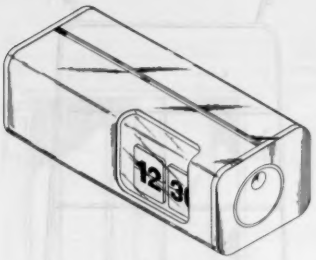
250,173
WINDOWED BACKING BOARD FOR A BACON PACKAGE OR THE LIKE
Roger M. Hovland, Park Forest, Ill., assignor to Swift & Company, Chicago, Ill.
Continuation-in-part of Ser. No. 614,948, Sep. 19, 1975. This application Mar. 18, 1976, Ser. No. 663,974
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—294



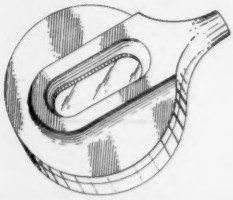
250,174
CLOCK HOUSING
Anthony J. Hedgecock, 7 Hillcrest, Brampton, Beccles, Suffolk, England
Filed Nov. 8, 1976, Ser. No. 739,942
Claims priority, application United Kingdom, May 11, 1976, 975595/76
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—1



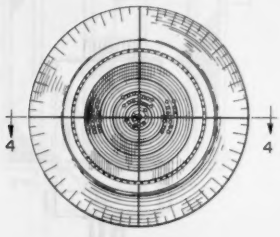
250,175
DIGITAL CLOCK
William Sklaroff, 722 E. Conshohocken State Rd., Penn Valley, Pa. 19072
Filed Dec. 8, 1976, Ser. No. 748,847
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



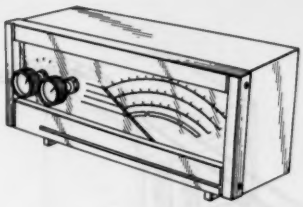
250,176
DIGITAL CLOCK
Masafumi Yamagami, and Yoshiaki Kobayashi, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jan. 28, 1977, Ser. No. 763,365
Claims priority, application Japan, Sep. 3, 1976, 51/35188
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



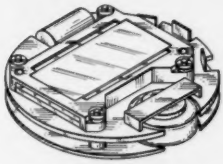
250,177
COMBINATION PROTRACTOR AND COMPASS
Herman L. Hulen, 23414 Balmoral Ave., Canoga Park, Calif. 91304
Filed Mar. 7, 1977, Ser. No. 775,567
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—62



250,178
DWELL/TACHOMETER
David E. Maxwell, Cary; James R. Shaffer, Mt. Prospect, and Lee Radtke, Lake Zurich, all of Ill., assignors to Sun Electric Corporation
Filed Nov. 24, 1976, Ser. No. 744,699
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—75



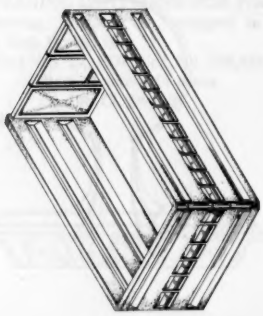
250,179
WATCH MODULE
William W. Vallandigham, Sunnyvale, and Robert M. Clary, Saratoga, both of Calif., assignors to Suncrux Incorporated, Cupertino, Calif.
Filed Mar. 4, 1977, Ser. No. 774,635
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—129



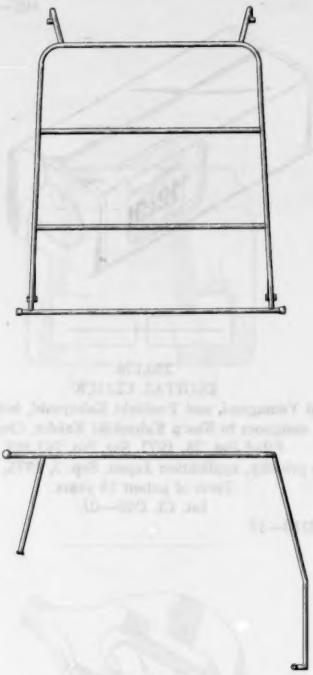
250,180
NECKLACE
Dina M. Rigney, Rte. 2, Box 780, North Scituate, R.I. 02857
Filed Jan. 3, 1977, Ser. No. 756,475
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—8

250,181
AWARD RACKET
Charles R. Nagy, 750 Pleasant Ave., Kalamazoo, Mich. 49008
Filed Mar. 18, 1977, Ser. No. 779,153
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—157

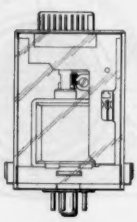
250,182
TRUCK BOX
John E. Fehr, and Bill L. Fehr, both of Box 1297, Morden, Canada
Filed May 10, 1977, Ser. No. 795,665
Claims priority, application Canada, Nov. 26, 1976, 2611764
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—98



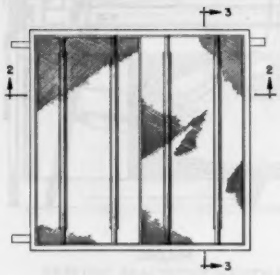
250,183
VEHICLE CANOE CARRIER
William A. Marshburn, Rte. 3, Box 814, Greensboro, N.C. 27410
Filed May 31, 1977, Ser. No. 801,767
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—157



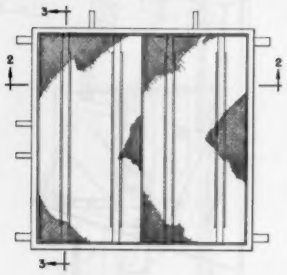
250,184
PNEUMATIC TIMING RELAY OR SIMILAR ARTICLE
Teizo Fujita, Ibaraki; Syunzo Yoshida, Takatsuki, and Toshio Koizumi, Kashihara, all of Japan, assignors to Izumi Denki Corporation, Japan
Filed Oct. 5, 1976, Ser. No. 729,878
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—33



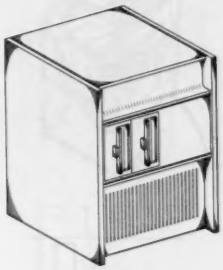
250,185
ELECTRODE ASSEMBLY
Michael J. Kubrin, Chardon, and Gerald R. Pohto, Mentor, both of Ohio, assignors to Diamond Shamrock Corporation
Filed Aug. 26, 1976, Ser. No. 718,059
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—99



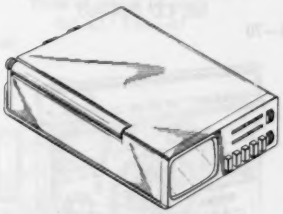
250,186
ELECTRODE ASSEMBLY
Gerald R. Pohto, Mentor, and Michael J. Kubrin, Chardon, both of Ohio, assignors to Diamond Shamrock Corporation
Filed Aug. 26, 1976, Ser. No. 718,061
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—99



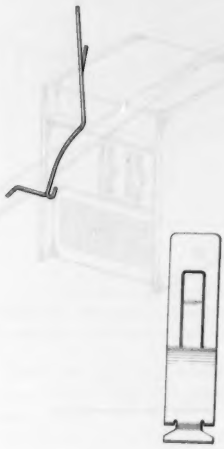
250,187
COMPUTER CABINET
Clarence D. Zierhut, Richardson, Tex., assignor to Mohawk Data Sciences Corp., Herkimer, N.Y.
Filed Nov. 15, 1976, Ser. No. 742,028
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—42



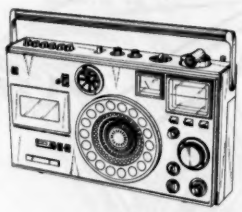
250,188
DISPLAY FOR ELECTRONIC EQUIPMENT
John H. Pemberton, Cambridge, England, assignor to Sinclair Radionics Limited, St. Ives, England
Filed Jan. 13, 1977, Ser. No. 759,005
Claims priority, application United Kingdom, Jul. 22, 1976, 976595
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43



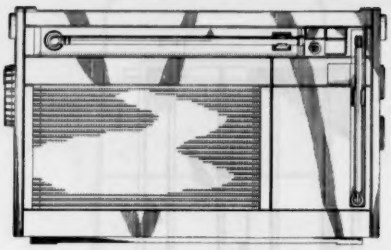
250,189
TELEPHONE MESSAGE HOLDER
Robert S. Hansen, 151 Glenwood Ct., Santa Rosa, Calif. 95405
Filed Jul. 30, 1976, Ser. No. 710,272
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—59

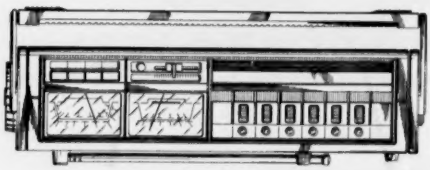


250,190
COMBINED PORTABLE RADIO AND CASSETTE RECORDER
Kazumasa Takenaka, Morigichi; Kikuo Ohta, Katano, and Benito Mishiro, Sokai, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Mar. 17, 1976, Ser. No. 667,804
Claims priority, application Japan, Sep. 19, 1975, 50-38369
Term of patent 14 years
Int. Cl.[2] D14—*03*
U.S. Cl. D14—70



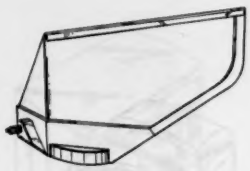
250,191
PORTABLE RADIO
John S. Kolwaite, Dewitt, N.Y., assignor to General Electric Company
Filed Dec. 30, 1976, Ser. No. 755,908
Term of patent 3 years
Int. Cl. D14—*03*
U.S. Cl. D14—70



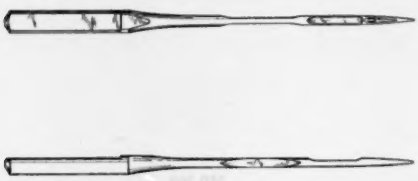


250,192
REMOTE COPYING APPARATUS
Walter Flohrer, Hofpfad, Germany, assignor to International Standard Electric Corporation, New York, N.Y.
Filed Jan. 21, 1976, Ser. No. 651,105
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D14—94

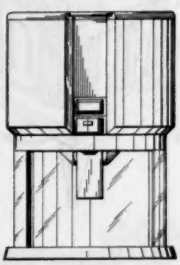
250,193
SIDE-SCREEN FOR A MOWING MACHINE
Pieter A. Oosterling, and Hendricus C. van Staveren, both of Nieuw-Vennep, Netherlands, assignors to Multinorm B.V., Nieuw-Vennep, Netherlands
Filed Nov. 17, 1976, Ser. No. 742,651
Claims priority, application Belgium, May 17, 1976, 153400
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—28



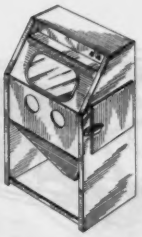
250,194
SEWING MACHINE NEEDLE
Susumu Hanyu, Hachioji, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan
Filed Jun. 1, 1976, Ser. No. 691,293
Claims priority, application Japan, Apr. 28, 1976, 51-015443
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—78



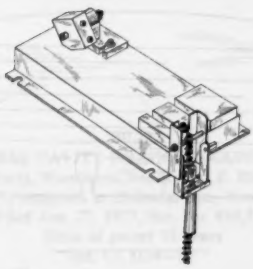
250,195
BEVERAGE DISPENSER
James A. Salmans, 1753 Bayberry La., Coshocton, Ohio 43812, and Stephen M. Degnen, 128 E. Sycamore St., Columbus, Ohio 43206
Filed Jun. 21, 1976, Ser. No. 697,787
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



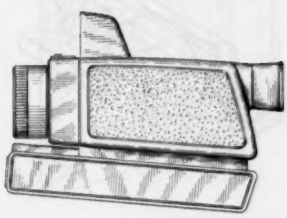
250,196
GLASS BEAD MACHINE CABINET FOR USE IN THE DRY BLAST CLEANING OF METAL PARTS
Anthony Caccioli, Long Meadow, Mass.; Philip A. Carlson, Glastonbury, Conn., and Jason Selden, Springfield, Mass., assignors to Gulf & Western Manufacturing Company
Filed Dec. 2, 1976, Ser. No. 747,120
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—124



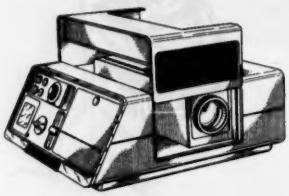
250,197
BAND SAW BASE
John E. Roberts, 6971 S. La., Waite Hill, Ohio 44092
Filed Jan. 28, 1977, Ser. No. 763,569
Term of patent 14 years
Int. Cl.[2] D15—*09*
U.S. Cl. D15—140



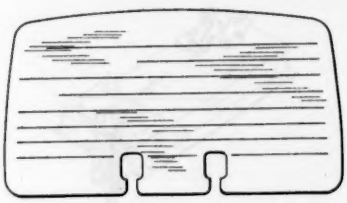
250,198
CAMERA
Ronald Emmerling, New City, N.Y., assignor to Berkey Photo, Inc.
Filed Apr. 20, 1977, Ser. No. 789,068
Term of patent 14 years
Int. Cl.[2] D16—*01*
U.S. Cl. D16—06



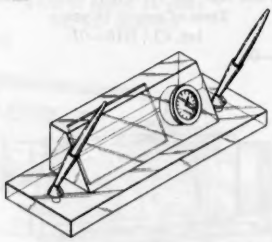
250,199
PHOTOGRAPHIC SLIDE PROJECTOR
Dieter Mankau, Braunschweig, Fed. Rep. of Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Fed. Rep. of Germany
Filed Nov. 4, 1976, Ser. No. 738,837
Claims priority, application Fed. Rep. of Germany, May 10, 1976, 1085
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—21



250,200
FILE CARD
Martin Glaubinger, Teaneck, N.J., assignor to Rolodex Corporation
Filed Oct. 7, 1975, Ser. No. 620,421
Term of patent 14 years
Int. Cl. D19—*08*
U.S. Cl. D19—1

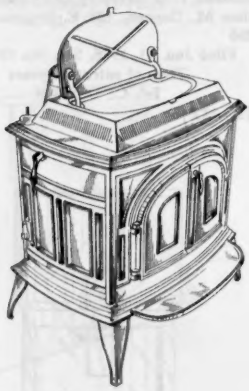


250,201
COMBINED DESK SET, CLOCK AND CALENDAR HOLDER
Coy S. Pierce, 1050 W. Knickerbocker, Sunnyvale, Calif. 94087
Filed Aug. 10, 1976, Ser. No. 713,123
Term of patent 14 years
Int. Cl. D19—*06;* D19—*03;* D10—*01*
U.S. Cl. D19—23

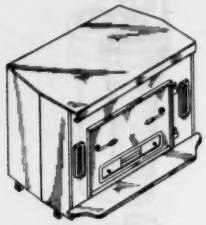


250,202
WATER CLOSET
Donald W. Doman, Janesville; Norman J. Jaeckels, and Gerard D. Phillips, Jr., both of Sheboygan, all of Wis., assignors to Kohler Co.
Filed Mar. 21, 1977, Ser. No. 779,614
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—65

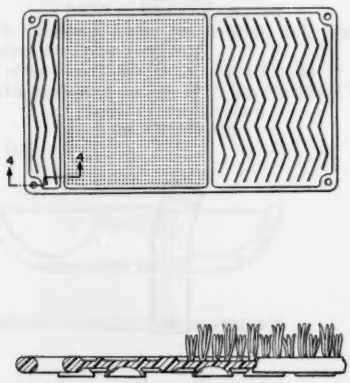
250,203
WOOD BURNING STOVE
Duncan C. Syme, Chelsea, Vt., assignor to Vermont Castings, Inc., Randolph, Vt.
Filed Jul. 29, 1977, Ser. No. 820,165
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



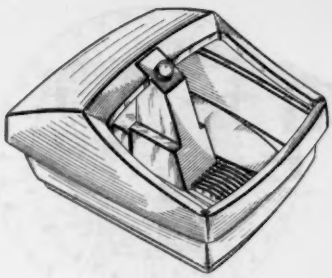
250,204
STOVE
Herbert L. Turner, I, 89 Grandview Rd., Asheville, N.C. 28806
Filed Oct. 21, 1977, Ser. No. 844,384
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



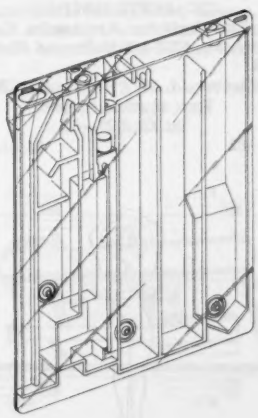
250,205
COMBINED WASHING AND MASSAGING DEVICE
Juanita J. Wilson, and Fitzpatrick Wilson, both of 2 Barnstable Ct., Owings Mills, Md. 21117
Filed Oct. 15, 1976, Ser. No. 732,921
Term of patent 14 years
Int. Cl. D24—*99;* D4—*02;* D7—*05*
U.S. Cl. D24—36



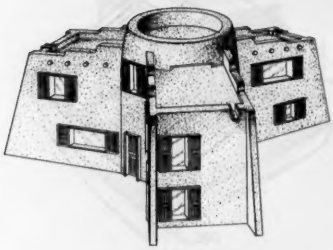
250,206
FOOT BATH MASSAGER
Monte L. Levin, New York, N.Y., assignor to Clairol, Inc., New York, N.Y.
Filed May 6, 1976, Ser. No. 683,855
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—38



250,207
PLEURAL CAVITY DRAINAGE CONTAINER
Leonard D. Kurtz, Woodmere, and Robert E. Bidwell, Melville, both of N.Y., assignors to Deknatel Inc., New York, N.Y.
Filed Jun. 27, 1977, Ser. No. 810,579
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—59



250,208
HOUSE
Ralph Mondragon, Box 199, Ranches of Taos, N. Mex. 87557
Filed Sep. 3, 1976, Ser. No. 720,463
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—33



250,209
CIGARETTE HOLDER
John Herman, 8264 Gould Ave., Los Angeles, Calif. 90046, and John S. Folse, Jr., 6727-1/8 Hollywood Blvd., Hollywood, Calif. 90028
Filed Aug. 1, 1977, Ser. No. 821,286
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—02

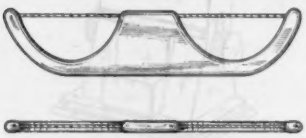
250,210
ELECTRIC SHAVER
Takeshi Takagi; Hisatane Ohi, and Yoshio Mizobata, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan
Filed Apr. 6, 1977, Ser. No. 785,149
Claims priority, application Japan, Oct. 8, 1976, 51-40150
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—50

250,211
ELECTRIC SHAVER
Takeshi Takagi; Hisatane Ohi, and Yoshio Mizobata, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan
Filed Apr. 6, 1977, Ser. No. 785,150
Claims priority, application Japan, Oct. 8, 1976, 51-40153
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—50

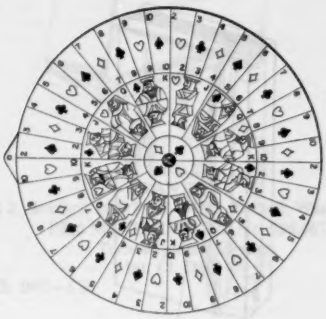
250,212
ELECTRIC SHAVER
Takeshi Takagi; Hisatane Ohi, and Yoshio Mizobata, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan
Filed Jun. 13, 1977, Ser. No. 806,228
Claims priority, application Japan, Dec. 13, 1976, 51-48696
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—50

250,213
ELECTRIC SHAVER
Takeshi Takagi; Hisatane Ohi, and Yoshio Mizobata, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan
Filed Jun. 13, 1977, Ser. No. 806,229
Claims priority, application Japan, Dec. 13, 1976, 51-48697
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—50

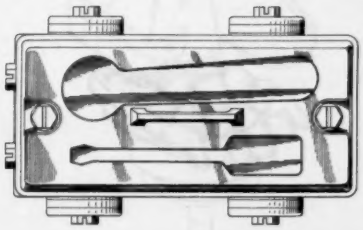
250,214
DENTAL FLOSS HOLDER
Ingram S. Chodorow, Upper Saddle River, N.J., assignor to Placontrol, Inc., New York, N.Y.
Division of Ser. No. 627,884, Oct. 31, 1975, Pat. No. D. 244,609.
This application Jan. 26, 1977, Ser. No. 762,567
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64



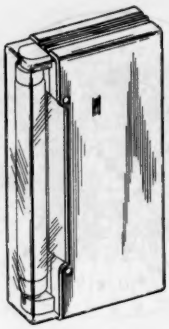
250,215
DART CARD GAMEBOARD
George M. Elliot, 231 Lee, Park Forest, Ill. 60466
Filed May 4, 1977, Ser. No. 793,767
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP



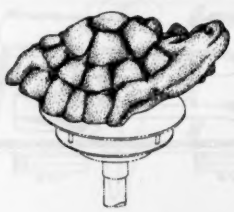
250,216
TOY VEHICLE
Adolph E. Goldfarb, 4614 Monarca Dr., Tarzana, Calif. 91345; Erwin Benkoe, deceased, late of Encino, Calif., and by Elisabeth Benkoe, executrix, 17965 Medley Dr., Encino, Calif. 91316
Filed Feb. 18, 1977, Ser. No. 770,222
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



250,217
FLUORESCENT LANTERN
Chung S. Leung, Kowloon, Hong Kong, assignor to Foster Industries Co. Limited, Kowloon, Hong Kong
Filed May 24, 1977, Ser. No. 800,088
Claims priority, application United Kingdom, Dec. 1, 1976, 978107/76
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R

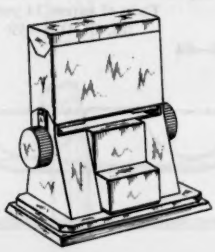


250,218
YARD LIGHT COVER
Minas P. Hazerjian, 72 Stivaletta Dr., Dedham, Mass. 02026, and Kevork P. Hazerjian, 19 Woodard Rd., West Roxbury, Mass. 02132
Filed Jan. 11, 1977, Ser. No. 753,531
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—38



250,219
LAMP POST
Stig Hasselqvist, Mjolby, Sweden, assignor to Handelsbolaget Scanovator, Linkoping, Sweden
Filed Jun. 17, 1977, Ser. No. 807,498
Claims priority, application Sweden, Dec. 23, 1976, 762547
Term of patent 14 years
Int. Cl. D26—*03;* D25—*01*
U.S. Cl. D48—38

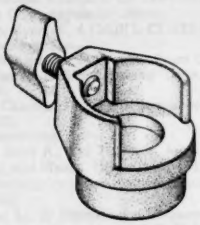
250,220
DISPENSER FOR MICROSCOPE SLIDES
Dieter Berger, Viernheim, and Erich Weiss, Mannheim-Sandhofen, both of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany
Filed Feb. 20, 1976, Ser. No. 659,819
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D52—2 R



250,221
RECEIVER HARDWARE FOR PERCUSSIVE MUSICAL INSTRUMENTS AND ACCESSORIES THEREFOR

Forrest W. Clark, Fountain Valley, and David G. Donohoe, Lakewood, both of Calif., assignors to CBS Inc., New York, N.Y.

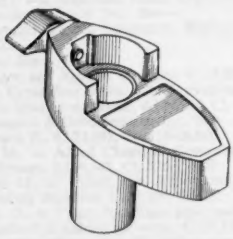
Filed Mar. 31, 1976, Ser. No. 672,520
Term of patent 14 years
Int. Cl. D17—*04*
U.S. Cl. D56—1 E



250,222
RECEIVER HARDWARE FOR PERCUSSIVE MUSICAL INSTRUMENTS

Forrest W. Clark, Fountain Valley, and David G. Donohoe, Lakewood, both of Calif., assignors to CBS Inc., New York, N.Y.

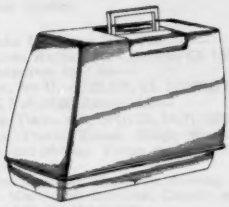
Continuation-in-part of Ser. No. 553,605, Feb. 27, 1975, abandoned. This application Mar. 31, 1976, Ser. No. 672,522
Term of patent 14 years
Int. Cl. D17—*04*
U.S. Cl. D56—1 E



250,223
COMBINED CARRYING CASE AND COVER FOR A SEWING MACHINE

Cristian J. Felix, 43-32 170th St., Flushing, N.Y. 11358

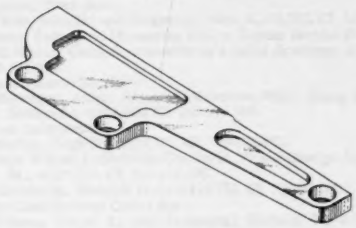
Filed Mar. 28, 1977, Ser. No. 781,900
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



250,224
VAN TRAY

Daniel J. Bradley, 10207 NE. 143rd, Bothell, Wash. 98011

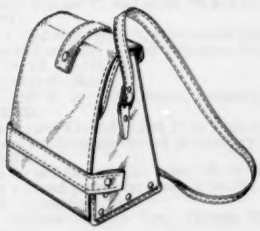
Filed May 12, 1977, Ser. No. 796,467
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D87—1 R



250,225
CARRYING CASE FOR A CAMERA AND ACCESSORIES OR THE LIKE

Sanford Sykes, Woodland Hills, Calif., assignor to Marsand Industries, Inc., Los Angeles, Calif.

Filed Mar. 3, 1977, Ser. No. 774,219
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—5 E



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF NOVEMBER, 1978

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

Aamoth, Gerald R.; and Hayashi, John K., to Atari, Inc. Joystick controller mechanism operating one or plural switches sequentially or simultaneously. 4,124,787, Cl. 200-6.00A.

Aaron, Bertram D.; and Pores, Edwin B. UHF antenna with air dielectric feed means. 4,124,851, Cl. 343-772.000.

AB Skanska Cementgjuteriet: *See*—
Isaksson, Sven G., 4,124,015, Cl. 125-23.00R.

Abar Corporation: *See*—
Jones, William R.; and Jindal, Prem C., 4,124,199, Cl. 266-88.000.

Abbate, Warren J. Yeast raising baking appliance. 4,123,969, Cl. 99-467.000.

Abbeloos, Charles J. Sound transmitting system. 4,124,249, Cl. 297-217.000.

Abbott Laboratories: *See*—
Martin, Jerry R.; and Tadanier, John S., 4,124,756, Cl. 536-17.000.

Abe, Michio; and Maeda, Naoyuki, to Tokai TRW & Co., Ltd. Ignition method and apparatus for internal combustion engine. 4,124,003, Cl. 123-119.00E.

Abel, Martin L., to Permalock Company. Conveying mechanism for yarns in pile forming apparatus. 4,124,432, Cl. 156-435.000.

Abele, Werner; Pistor, Wolfgang; Schmidt, Manfred; Smith, Harry O.; and Spannhake, Nils, to Du Pont de Nemours, E. I., and Company. Process for hardening photographic silver halide emulsions. 4,124,397, Cl. 96-109.000.

Abolins, Visvaldis; and Lee, Gim F., Jr., to General Electric Company. Thermoplastic molding compositions of vinyl aromatic compound alpha, beta unsaturated cyclic anhydride copolymers. 4,124,654, Cl. 260-876.00B.

Abraham, Edward D., to Carver Foundry Products. Roll-over mechanism. 4,124,126, Cl. 214-1.00Q.

ACF Industries, Incorporated: *See*—
Alvarez, Patricio D.; Houlgrave, Robert C.; and Kalsi, Manmohan S., 4,124,194, Cl. 251-159.000.
Niebrzydoski, John L., 4,124,661, Cl. 261-23.00A.
Reedy, Charles E.; and Carlson, Edwin S., 4,124,193, Cl. 251-144.000.

Acieries Reunies de Burbach-Eich-Dudelange S.A. Arbed: *See*—
Herrig, Klaus; and Wagner, Heinz, 4,124,183, Cl. 245-6.000.

Ackerman, George L., to Action Machining Corp. Action piercing fastener. 4,124,050, Cl. 29-798.000.

Ackerman, Myron H. Folded tie liner. 4,123,802, Cl. 2-144.000.

Action Machining Corp.: *See*—
Ackerman, George L., 4,124,050, Cl. 29-798.000.

Adams, Albert A.; Balogh, Karoly G.; and Prugh, Tommy J., to Certain-teed Corporation. Shingle stacking. 4,124,128, Cl. 214-6.0DK.

Adams, Ronald J. Buoyant float and flag assembly. 4,123,813, Cl. 9-8.00R.

Adelberg, Roy. Auto trunk lid holder. 4,124,240, Cl. 292-262.000.

Adicoff, Arnold: *See*—
Martin, Eugene C.; and Adicoff, Arnold, 4,124,657, Cl. 260-879.000.

Adin, Anthony; Huttemann, Thomas J.; and Lindholm, Robert D., to Eastman Kodak Company. Coblat complex amplification imaging system with blocked dye precursor. 4,124,392, Cl. 96-77.000.

Adjemian, Alain: *See*—
Cohen, Joseph; and Adjemian, Alain, 4,124,680, Cl. 423-126.000.

Advanced Technology Center, Inc.: *See*—
Petersen, Donald H.; and Schwemer, Warren C., 4,124,665, Cl. 264-28.000.

Agache, Georges: *See*—
Oswald, Roger; and Agache, Georges, 4,123,997, Cl. 123-1.00A.

Agoro, John W. Crystalline caffeic acid derivatives and compositions and method for treating snakebite. 4,124,724, Cl. 424-317.000.

Agricultural Research & Development, Inc.: *See*—
Laurenz, Frank R., 4,123,992, Cl. 119-16.000.

Aharoni, Shaul M., to Allied Chemical Corporation. Aryl mercury containing polymers. 4,124,749, Cl. 526-15.000.

Ahlstone, Arthur G., to Vetco, Inc. Rigid connector for pipe and method for making the same. 4,124,229, Cl. 285-18.000.

Ahlstone, Arthur G., to Vetco, Inc. Rigid pipe connector with locking screws and method of making the same. 4,124,230, Cl. 285-18.000.

Ahlstone, Arthur G., to Vetco, Inc. Rigid pipe connector with radially shiftable lock elements and method of making the same. 4,124,231, Cl. 285-18.000.

Ahlstone, Arthur G., to Vetco, Inc. Rigid pipe connector with lock elements and method of making the same. 4,124,232, Cl. 285-18.000.

Ahlstone, Arthur G., to Vetco, Inc. Rigid pipe connector with lock ring and method of making the same. 4,124,233, Cl. 285-18.000.

Aicello Chemical Co., Ltd.: *See*—
Hashiudo, Keinichi; and Imanishi, Kanji, 4,124,549, Cl. 260-18.00N.

Aigner, Georg, to Siemens Aktiengesellschaft. Electromagnetic relay. 4,124,832, Cl. 335-128.000.

Air Preheater Company, Inc., The: *See*—
Stockman, Richard F., 4,124,063, Cl. 165-9.000.

Airway Industries, Inc.: *See*—
Weiner, Jay H., 4,123,839, Cl. 29-434.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kagata, Tooru, 4,123,951, Cl. 74-711.000.
Oguma, Tomio; Kawai, Shinji; Minamoto, Naoki; Yamaguchi, Yuji; and Makino, Tetsuo, 4,123,807, Cl. 4-7.000.

Aizawa, Hiroshi: *See*—
Uchidoi, Masanori; Miyakawa, Hideaki; Aizawa, Hiroshi; Yamamichi, Masayoshi; Ohshima, Osamu; and Tunekawa, Tokuichi, 4,124,855, Cl. 354-24.000.

Ajluni, Raymond M.: *See*—
Otrhalek, Joseph V.; Ajluni, Raymond M.; and Gomes, Gilbert S., 4,124,414, Cl. 148-6.15R.

Akashi, Shunji, to Yoshida Kogyo K.K. Automatically locking dual-tab slider for slide fasteners. 4,123,828, Cl. 24-205.14K.

Akatsuka, Takeaki; Kitagawa, Katsuichi; Amo, Hiroyoshi; and Mita, Osamu, to Toray Industries, Inc. Apparatus for controlling the gap between lips of a die for extruding a plastic sheet material. 4,124,342, Cl. 425-141.000.

Akebono Brake Industry Company, Ltd.: *See*—
Maehara, Toshifumi, 4,124,105, Cl. 188-1.00A.

AKG Akustische u. Kino-Gerate Gesellschaft m.b.H.: *See*—
Schon, Manfred, 4,124,782, Cl. 179-100.41K.

Akgerman, Nuri: *See*—
Flora, John H.; and Akgerman, Nuri, 4,124,792, Cl. 219-124.340.

Akimoto, Tadao; and Hiramatsu, Eiji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Catalytic converter of a radial flow type. 4,124,357, Cl. 422-181.000.

Akiyama, Kazuhito: *See*—
Shinohara, Akira; Akiyama, Kazuhito; Miki, Akira; and Matsui, Sadayoshi, 4,124,640, Cl. 260-575.000.

Akzona Incorporated: *See*—
Mellon, Regis B., 4,124,781, Cl. 179-90.00D.
Mijs, Willem J.; Dusseau, Charles H. V.; and Sinnige, Hermannus J M., 4,124,763, Cl. 544-219.000.
Oosterwijk, Hendrik H. J., 4,124,752, Cl. 526-94.000.

Albany International Corp.: *See*—
Zabron, Floyd S.; and Jankowski, Richard F., 4,124,423, Cl. 156-88.000.

Albert, Frank D.; Conroy, Alan P.; and Skinner, David L., to Jim Walter Resources, Inc. Method of producing organic short fibers and treatment thereof with a silane. 4,124,730, Cl. 427-220.000.

Albizzati, Enrico: *See*—
Giannini, Umberto; Albizzati, Enrico; Parodi, Sandro; and Pirinoli, Franco, 4,124,532, Cl. 252-429.00B.

Albright, Henry J., to Fawn Engineering Corporation. Connection apparatus for a vending machine. 4,124,142, Cl. 221-75.000.

Albright, Larry E.; and Bauer, James J., to Clark Equipment Company. Parking brake for a skid steer loader vehicle. 4,124,084, Cl. 180-6.480.

Aldana, Elphious, to Kustom Fit Manufacturing Company. Convertible sofa bed and cover. 4,123,811, Cl. 5-43.000.

Alexander, Lloyd G. Methods of determining well characteristics. 4,123,937, Cl. 73-155.000.

Allan, Nelson S., III: *See*—
Zahornasky, Vincent T.; and Allan, Nelson S., III, 4,124,849, Cl. 343-7.00G.

Allart, Pierre J.; and May, Henri B., to Monsanto Company. Encapsulation process and resulting aqueous dispersion of encapsulated droplets. 4,124,526, Cl. 252-316.000.

Alleman, Benjamin D.: *See*—
Bess, Kenneth B., Jr.; and Alleman, Benjamin D., 4,123,982, Cl. 112-169.000.

Allen, Joseph C.; and Korstad, Ralph J., to Texaco Inc. High vertical and horizontal conformance viscous oil recovery method. 4,124,071, Cl. 166-263.000.

Allen, Joseph C.; and Harnsberger, Bobby G., to Texaco Inc. Method for forming a gravel pack in tar sands. 4,124,074, Cl. 166-278.000.

Allen-Stevens Corporation: *See*—
Ziegler, Michael J.; and Lee, Thomas D., 4,124,140, Cl. 220-304.000.

Alles, Hans-Ulrich: *See*—
Horak, Otto; Alles, Hans-Ulrich; Horstmann, Walter; Hammerstrom, Knut; and Potthast, Ruthard, 4,124,505, Cl. 210-63.00R.

Allied Chemical Corporation: *See*—
Aharoni, Shaul M., 4,124,749, Cl. 526-15.000.
Dench, John E.; and Seven, Manfred K., 4,124,753, Cl. 526-208.000.

Alrazi, Jamil A. R. Gas lock for hypodermic. 4,124,025, Cl. 128-218.00R.

Alterman, David S.; and Chun, Kil W., to Lever Brothers Company. Encapsulated particles. 4,124,734, Cl. 428-403.000.

Aluminium Norf GmbH: *See—*
Sporenberg, Willi; and Wagner, Reinhold, 4,124,415, Cl. 148-13.000.

Aluminiumipari Tervezo es Kutato Intezet/ALUTERV-FKI: *See—*
Anka, Mihaly; Lukacs, Peter; Gallo, Dezso; Szabics, Jozsef; and Szalay, Geza, 4,124,416, Cl. 148-13.000.

Aluminum Company of America: *See—*
Jacobs, Stanley C.; and King, Larry K., 4,124,682, Cl. 423-495.000.

Aluminum Pechiney: *See—*
Cohen, Joseph; and Adjemian, Alain, 4,124,680, Cl. 423-126.000.

Alvarez, Patricio D.; Houlgrave, Robert C.; and Kalsi, Manmohan S., to ACF Industries, Incorporated. Metallic seat construction for valves. 4,124,194, Cl. 251-159.000.

Amadei, Ottavio: *See—*
Murer, Angelo; and Amadei, Ottavio, 4,124,747, Cl. 429-210.000.

Amanuma, Takahiko: *See—*
Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, 4,124,296, Cl. 355-75.000.

Amass, Peter, to Minnesota Mining and Manufacturing Company. Digital frame synchronizing circuit. 4,124,778, Cl. 179-15.0BS.

Ambac Industries Incorporated: *See—*
White, Thomas G., 4,124,192, Cl. 251-129.000.

Amchem Products, Inc.: *See—*
Binns, Robert E., 4,124,407, Cl. 134-3.000.

Amemiya, Koji: *See—*
Hamazaki, Yasuhiko; Kawabata, Shozo; Yamamoto, Toshiyuki; Shiraishi, Yasuo; Ueno, Akira; Amemiya, Koji; and Saga, Katsumas, 4,124,726, Cl. 424-331.000.

Amerace Corporation: *See—*
Vecchiotti, Camillo M., 4,124,427, Cl. 156-217.000.

America Cyanamid Company: *See—*
Lutz, Albert W.; and Diehl, Robert E., 4,124,639, Cl. 260-573.000.

American Air Filter Company, Inc.: *See—*
Revell, Alan E., 4,124,361, Cl. 55-493.000.
Westlin, Karl L.; and Cork, Herbert V., Jr., 4,124,362, Cl. 55-509.000.

American Brass & Aluminum Foundry Co., Inc.: *See—*
Oropallo, Robert A., 4,123,810, Cl. 4-288.000.

American Can Company: *See—*
Herdzina, Frank J.; and Urso, Patrick F., 4,124,433, Cl. 156-456.000.
Meyers, George L.; and Webb, Russell R., 4,124,160, Cl. 229-21.000.
Meyers, George L., 4,124,161, Cl. 229-37.00R.

American Cyanamid Company: *See—*
Paul, Rolf; and Menschik, Judith, 4,124,766, Cl. 548-337.000.
Wood, Irwin B., 4,124,626, Cl. 424-118.000.

American District Telegraph Company: *See—*
LiCalsi, Joseph, 4,124,795, Cl. 235-70.00A.

American Hoechst Corporation: *See—*
McFadden, Arthur R.; and Aultz, Daniel E., 4,124,713, Cl. 424-256.000.

American Home Products Corporation: *See—*
Lapidus, Milton, 4,124,578, Cl. 260-112.5LH.

American Optical Corporation: *See—*
Naylor, Thomas K., 4,124,822, Cl. 330-10.000.

American Seating Company: *See—*
Blodee, Leif; Knapp, Robert L.; and Oppenhuizen, Simon W., 4,123,879, Cl. 52-36.000.

American Videonetics Corporation: *See—*
Arnstein, Walter, 4,124,820, Cl. 328-55.000.

AMF Incorporated: *See—*
Stoor, Jon D., 4,123,915, Cl. 62-234.000.

Amo, Hiroyoshi: *See—*
Akatsuka, Takeaki; Kitagawa, Katsuichi; Amo, Hiroyoshi; and Mita, Osamu, 4,124,342, Cl. 425-141.000.

Amstutz, Harlan C.; and Clarke, Ian C., to University of California, Regents of the. Total hip joint replacement. 4,123,806, Cl. 3-1.912.

Andersen, James Holger: *See—*
Aspenson, Gary Lee; and Andersen, James Holger, 4,124,055, Cl. 160-193.000.

Anderson, Glenn W.: *See—*
Hutchison, Stanley O.; Anderson, Glenn W.; and Newby, Gordon L., 4,124,547, Cl. 260-5.000.

Anderson, John A.: *See—*
Narasimhan, Mandayam J.; and Anderson, John A., 4,124,448, Cl. 195-1.800.

Anderson, Merril J., to Sperry Rand Corporation. Circuit for bi-directionally powering a motor. 4,124,811, Cl. 318-293.000.

Andersson, Lars O.; Isfalt, Engelbrekt; and Rosell, Axel. Method and device for controlling the temperature in a premise. 4,124,062, Cl. 165-2.000.

Andersson, Sven O. S.: *See—*
Reinhardt, Hans; Ottertun, Harald D.; and Andersson, Sven O. S., 4,124,462, Cl. 204-119.000.

Ando, Ryo: *See—*
Suzuki, Gyoichi; Ando, Ryo; Koyama, Tatsuo; Kubodera, Shoji; and Kondo, Renichi, 4,124,404, Cl. 106-103.000.

Andreas Stihl, Firma: *See—*
Bauer, Peter; Dietzsch, Guenter; Landwehr, Goetz; and Schulin, Gotthilf, 4,123,843, Cl. 30-383.000.

Anello, Louis G.; Berenbaum, Morris B.; Peterson, James O.; Sukornick, Bernard; and Sogn, Allen W., to Buffalo Color Corporation. Sulfonation of anthraquinone in sulfur dioxide solvent. 4,124,606, Cl. 260-370.000.

Anisic, Ladislav, to Fried. Krupp GmbH. Homogenizer for viscous materials. 4,124,307, Cl. 366-76.000.

Anka, Mihaly; Lukacs, Peter; Gallo, Dezso; Szabics, Jozsef; and Szalay, Geza, to Aluminiumipari Tervezo es Kutato Intezet/ALUTERV-FKI; Szekesfehervari Konnyufemmu; and Budapesti Muszaki Egyetem. Process for the heat treatment of coils of metallic strip, preferably of aluminum and aluminum alloys. 4,124,416, Cl. 148-13.000.

Antoine, Lucien; Maubon, Andre; and Largeron, Gerard, to Creusot-Loire Enterprises; and Clesid S.A. Converter for refining liquid metals, with heating and blowing in means. 4,124,200, Cl. 266-158.000.

Antos, George J.; Hayes, John C.; and Mitsche, Roy T., to UOP Inc. Hydrocarbon conversion with a selectively sulfided acidic multimetallic catalytic composite. 4,124,491, Cl. 208-139.000.

Anzai, Shiro: *See—*
Watabe, Yoji; Ishii, Michio; Kaneda, Hiroshi; Ino, Fumitaka; Kuwano, Masao; Ura, Yasuyuki; and Anzai, Shiro, 4,124,573, Cl. 528-53.000.

Aoyama, Syunichi, to Nissan Motor Company, Ltd. Exhaust gas recirculation control system. 4,124,004, Cl. 123-119.00A.

Archer, Sydney, to Sterling Drug Inc. Therapeutic method of controlling tachycardia. 4,124,722, Cl. 424-308.000.

Archifar Laboratori Chimico Farmacologici S.p.A.: *See—*
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,124,585, Cl. 260-239.30P.
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,124,586, Cl. 260-239.30P.

Arco Industries Corporation: *See—*
Harvey, David L., 4,123,956, Cl. 83-620.000.

Areschka, Alex: *See—*
Descamps, Marcel; and Areschka, Alex, 4,124,710, Cl. 424-248.560.

Arghiropoulos, Basile; and Tignol, Adrien P. N., to Produits Chimiques Ugine Kuhlmann. Process for the sequestration of oxygen dissolved in water and compositions useful for such purpose. 4,124,500, Cl. 210-59.000.

Argus Chemical Corporation: *See—*
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,124,564, Cl. 260-45.80N.

Ariga, Masao: *See—*
Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, 4,124,296, Cl. 355-75.000.

Arkhipov, Evgeny A.: *See—*
Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.

Armco Steel Corporation: *See—*
Elias, James A.; and Hook, Rollin E., 4,124,412, Cl. 148-2.000.

Armentrout, James L.; and Schneider, George H. Sterile container. 4,124,141, Cl. 220-306.000.

Armington, Raymond Q.; Atwater, Wayne G.; and Longaker, Charles F., to Triax Company, The. Storage framework and method. 4,124,123, Cl. 211-186.000.

Armstrong Cork Company: *See—*
Bachman, Robert C., 4,124,164, Cl. 239-533.150.
Dieck, Ronald L.; and Quinn, Edwin J., 4,124,557, Cl. 260-30.60R.
Dieck, Ronald L.; and Magnusson, Alan B., 4,124,567, Cl. 528-168.000.

Armstrong, Warren E.; Ryland, Lloyd B.; and Voge, Hervey H., to Shell Oil Company. Catalyst comprising Ir or Ir and Ru for hydrazine decomposition. 4,124,538, Cl. 252-466.0PT.

Arneklev, Duane R.: *See—*
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,124,372, Cl. 71-88.000.
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,124,376, Cl. 71-118.000.

Arnstein, Walter, to American Videonetics Corporation. Asynchronous digital delay line. 4,124,820, Cl. 328-55.000.

Arthur D. Little, Inc.: *See—*
Modell, Michael, 4,124,528, Cl. 252-411.00R.

Arzoumanidis, Gregory G., to Stauffer Chemical Company. Olefin polymerization catalyst comprising a monoterpenic ketone and process employing same. 4,124,530, Cl. 252-429.00B.

Asahi Glass Company, Ltd.: *See—*
Gotoh, Isao; Endoh, Junji; and Ueno, Tohru, 4,124,634, Cl. 562-532.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Miyake, Tetsuya; and Takeda, Kunihiko, 4,124,770, Cl. 568-758.000.

Asahi Medical Co., Ltd.: *See—*
Iijima, Seiichi; and Hazama, Akikazu, 4,124,509, Cl. 210-321.00B.

Asami, Kazuto, to Glory Kogyo Kabushiki Kaisha. Coin packaging machine. 4,123,892, Cl. 53-54.000.

Asano, Kazuhiro; Ishikawa, Takehiro; Yasuda, Kazumasa; and Ishijima, Takashi, to Kabushiki Kaisha Daini Seikosha. Digital electronic timepiece. 4,123,896, Cl. 58-39.500.

Asano, Masaharu, to Nissan Motor Company, Ltd. Feedback air-fuel ratio control system for internal combustion engine capable of providing constant control signal at start of fuel feed. 4,123,999, Cl. 123-32.0EE.

Ashland Oil, Inc.: *See—*
Schafer, Robert J.; and Toeniskoetter, Richard H., 4,124,556, Cl. 260-29.15B.

Aspenson, Gary Lee; and Andersen, James Holger, to Mosher Doors, Inc. Canopy door. 4,124,055, Cl. 160-193.000.

Assenheimer, Jurgen; and Brettschneider, Johannes, to Robert Bosch GmbH. Supplementary air supply system for an internal combustion engine. 4,124,005, Cl. 123-119.0EC.

Asta-werke Aktiengesellschaft: *See*—
Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, 4,124,716, Cl. 424-267.000.

Atari, Inc.: *See*—
Aamoth, Gerald R.; and Hayashi, John K., 4,124,787, Cl. 200-6.00A.

Atex Corporation: *See*—
Bramson, Harvey G.; and Ying, Charles W., 4,124,843, Cl. 340-337.000.

Athey, Stuart E.: *See*—
Brackman, Donald A.; and Athey, Stuart E., 4,124,310, Cl. 366-314.000.

Atlantic Richfield Company: *See*—
Collins, Thomas A.; and Voss, Andrew P., 4,124,490, Cl. 208-139.000.
Kao, Jar-lin; and Leonard, John J., 4,124,635, Cl. 562-533.000.
Leonard, John J.; and Kao, Jar-lin, 4,124,633, Cl. 562-598.000.

Atsarkin, Vadim A.: *See*—
Mefed, Anatoly E.; and Atsarkin, Vadim A., 4,124,813, Cl. 324-0.50A.

Atsumi, Tomiaki: *See*—
Kajiya, Sadao; Atsumi, Tomiaki; Kuroda, Osamu; and Nakakubo, Tamio, 4,124,092, Cl. 181-265.000.

Atwater, Wayne G.: *See*—
Armington, Raymond Q.; Atwater, Wayne G.; and Longaker, Charles F., 4,124,123, Cl. 211-186.000.

Auergesellschaft GmbH: *See*—
Hoht, Wolfgang, 4,123,934, Cl. 73-27.00R.

Augis, John M.; and Buehlman, Victor J., to Indian Head Inc. Modular cable trench system. 4,124,324, Cl. 404-3.000.

Aultz, Daniel E.: *See*—
McFadden, Arthur R.; and Aultz, Daniel E., 4,124,713, Cl. 424-256.000.

Automated Components Inc.: *See*—
Preston, Harold, 4,124,424, Cl. 156-155.000.

Automatik Apparate-Maschinenbau H. Hench Gesellschaft mit beschraenkter Haftung: *See*—
Locker, Peter, 4,124,341, Cl. 425-136.000.

Automation Industries, Inc.: *See*—
Clark, Robert V.; Linder, Francis X.; and Taylor, William R., 4,124,848, Cl. 340-524.000.
Cooper, Earl A., 4,123,842, Cl. 29-592.00R.

Axelrod, Donald J.; and Flint, John R., to Bell & Howell Company. System for interfacing an automatic processing machine with a stack of documents which it is processing. 4,124,290, Cl. 355-41.000.

Azuma, Minoru; Tamura, Junichi; and Mori, Zenichi, to Kao Soap Company. Anti-static agent composition. 4,124,543, Cl. 252-8.600.

B.B.R. Australia Pty. Ltd.: *See*—
Hutchins, Warwick B., 4,124,321, Cl. 403-167.000.

Babcock & Wilcox Company, The: *See*—
Jabsen, Felix S.; Schluderberg, Donald C.; and Paulson, Arnold E., 4,124,064, Cl. 165-69.000.
Jabsen, Felix S., 4,124,444, Cl. 176-78.000.

Bach, Fritz H.: *See*—
Bach, Marilyn L.; and Bach, Fritz H., 4,124,701, Cl. 424-12.000.

Bach, Marilyn L.; and Bach, Fritz H., to Wisconsin Alumni Research Foundation. Method for preparing a reagent for PLT and method of use. 4,124,701, Cl. 424-12.000.

Bachelor, Robert. Morse code signalling device. 4,124,842, Cl. 340-321.000.

Bachman, Robert C., to Armstrong Cork Company. Tamper proof safety cut-off fluid nozzle. 4,124,164, Cl. 239-533.150.

Bacon, Roger J.: *See*—
Enters, Edward W.; and Bacon, Roger J., 4,123,857, Cl. 37-43.00E.

Baertsch, Richard D.; and Engeler, William E., to General Electric Company. Charge transfer filter. 4,124,861, Cl. 357-24.000.

Baggiani, Andrea, to Societa Italiana Telecomunicazioni Siemens S.P.A. Junction between coaxial main and branch transmission lines. 4,124,772, Cl. 174-71.00C.

Baker, Donald J.: *See*—
Brown, Arthur K.; Baker, Donald J.; and Jackson, Robert W., 4,123,965, Cl. 92-136.000.

Baker, Melvin A.: *See*—
Spinner, Joseph R.; and Baker, Melvin A., 4,124,145, Cl. 222-56.000.

Baker, William B.; and Clark, Donald G., to Du Pont de Nemours, E. I., and Company. Dosimeter for monitoring working areas. 4,123,932, Cl. 73-28.000.

Bako, Lazlo, to Presto Lock Company, division of Walter Kiddie & Company, Inc. Combination lock. 4,123,923, Cl. 70-74.000.

Balcke-Durr Aktiengesellschaft: *See*—
Gersch, Karl H.; and Losel, Georg, 4,123,994, Cl. 122-6.00A.

Baldwin-Gegenheimer Corporation: *See*—
Gasparrini, C. Robert, 4,123,972, Cl. 101-363.000.

Ballast-Nedam Groep N.V.: *See*—
de Koning, Jan, 4,123,859, Cl. 37-58.000.
De Koning, Jan; Van Den Brink, Theodorus; and Wolters, Tjako A., 4,123,860, Cl. 37-72.000.

Balogh, Karoly G.: *See*—
Adams, Albert A.; Balogh, Karoly G.; and Prugh, Tommy J., 4,124,128, Cl. 214-6.0DK.

Bamberg, Wolfgang: *See*—
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,124,597, Cl. 260-343.600.

Bang and Olufsen A/S: *See*—
Sorensen, N. Krebs, 4,124,216, Cl. 274-23.00A.

Barasch, Stephen, to Burroughs Corporation. Method and apparatus for xerographically printing a composite record of fixed and variable data. 4,124,286, Cl. 355-3.00R.

Barber, Everett M., Jr.; and Hopper, Thomas P., to Sunworks, Inc. Solar energy collector. 4,123,883, Cl. 52-200.000.

Barge, Timothy T., to Masano, Thomas J.; and Masano, John T., part interest to each. Sprinkler head with wall penetrating means. 4,124,077, Cl. 169-70.000.

Barnes, Philip E., to United Technologies Corporation. Cam-operated pitch-change apparatus. 4,124,330, Cl. 416-157.00B.

Barry, Leonard D. Loader and storage system. 4,124,129, Cl. 214-38.00C.

Barry-Wehmiller Company: *See*—
Murray, Orin L.; and Kriegesmann, Edwin P., 4,124,018, Cl. 126-271.000.

Barta, Kent S.; and Gross, Jerome A. Method and apparatus for bacterial microscopy. 4,124,449, Cl. 195-139.000.

Barton, Boyd O. Method for cleaning mouthpiece of smoking article. 4,124,522, Cl. 252-142.000.

Barton, Roy G. H., to Xerox Corporation. Document handling. 4,124,205, Cl. 271-233.000.

BASF Aktiengesellschaft: *See*—
Eicken, Karl; Theobald, Hans; Hansen, Hanspeter; Wuerzer, Bruno; and Fett, Kurt, 4,124,591, Cl. 260-307.00H.
Koehnlein, Ernst; Glaser, Rudolf; and Koessler, Ludwig, 4,124,655, Cl. 260-878.00R.

BASF Wyandotte Corporation: *See*—
Otrhalek, Joseph V.; Ajluni, Raymond M.; and Gomes, Gilbert S., 4,124,414, Cl. 148-6.15R.

Bassist, Rudolph G. Apparatus for feeding filling threads to a warp knitting machine. 4,123,920, Cl. 66-84.00A.

Batchelder, George W. Versatile submersible device for dredging or other underwater functions. 4,123,858, Cl. 37-56.000.

Bathelt, Heinrich, to Hoechst Aktiengesellschaft. Perfluoroalkylacetyl chloride process. 4,124,469, Cl. 204-163.00R.

Battarel, Claude, to Crouzet. Domain propagation register with single layer of conductors. 4,124,901, Cl. 365-88.000.

Battelle Development Corporation: *See*—
Maringer, Robert E., 4,124,664, Cl. 264-8.000.

Battelle Memorial Institute: *See*—
Morrey, John R., 4,124,466, Cl. 204-157.10R.

Batts, John H.; and Garrison, Judd F., to John Thomas Batts, Inc. Tally for article displays. 4,123,864, Cl. 40-322.000.

Bauer, James J.: *See*—
Albright, Larry E.; and Bauer, James J., 4,124,084, Cl. 180-6.480.

Bauer, Peter; Dietzsch, Guenter; Landwehr, Goetz; and Schulin, Gotthilf, to Andreas Stihl, Firma. Spring type guide bar stop for portable power chain saw. 4,123,843, Cl. 30-383.000.

Bauer, Richard G.: *See*—
Rubio, Diego C., Jr.; Bauer, Richard G.; and Scriver, Richard M., Jr., 4,124,546, Cl. 260-5.000.

Bayer Aktiengesellschaft: *See*—
Bock, Manfred; Pedain, Josef; Uerdingen, Walter; and Schonfelder, Manfred, 4,124,569, Cl. 528-61.000.
Herzig, Joachim, 4,124,560, Cl. 260-37.0SB.
Hocker, Jurgen; Diehr, Hans-Joachim; and Merten, Rudolf, 4,124,545, Cl. 521-129.000.
Horak, Otto; Alles, Hans-Ulrich; Horstmann, Walter; Hammerstrom, Knut; and Potthast, Ruthard, 4,124,505, Cl. 210-63.00R.
Koch, Heinrich; and Lehnen, Josef, 4,124,559, Cl. 260-33.6AQ.
Kramer, Carl; and Gerhardt, Hans J., 4,123,805, Cl. 3-1.500.
Kramer, Wolfgang; Draber, Wilfried; Buchel, Karl H.; Brandes, Wilhelm; and Lurssen, Klaus, 4,124,369, Cl. 71-76.000.
Pieper, Christian; Feltgen, Karlheinz; and Nogaj, Alfred, 4,124,673, Cl. 264-171.000.
Pieper, Christian; Uhlemann, Hans; Feltgen, Karlheinz; Nickel, Klaus; Nogaj, Alfred; and Lorenz, Gunter, 4,124,674, Cl. 264-233.000.
Vor der Bruck, Dieter; and Wolfrum, Gerhard, 4,124,581, Cl. 260-158.000.
Wilhelm, Gerd; Jaschke, Artur; Simon, Hans-Jurgen; Schmidt, Jens; and Sandhu, Surinder S., 4,124,666, Cl. 264-39.000.
Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, 4,124,568, Cl. 528-59.000.

Bayerische Motoren Werke Aktiengesellschaft: *See*—
Bortfeld, Manfred, 4,124,087, Cl. 180-91.000.

Bazell, Graydon C., to de Laval Separator Company, The. Processing of crude oils. 4,124,495, Cl. 208-251.00R.

Bean, Lloyd F.; and Miller, Roger L., to Xerox Corporation. Imaging system utilizing uncharged marking particles. 4,124,287, Cl. 355-3.00R.

Beaton, John M., to Upjohn Company, The. Preparation of sterol substrates for bioconversion. 4,124,607, Cl. 260-397.250.

Beauchamp, Aaron C. Highway cross-country tire. 4,124,052, Cl. 152-209.00B.

Beck, Robert E., to Container Corporation of America. Partition arrangement. 4,124,158, Cl. 229-15.000.

Becker, Rolf. Picture frame. 4,123,863, Cl. 40-152.000.

Becker, Rudolf, to Linde Aktiengesellschaft. Heat exchanger with spirally wound sheets. 4,124,069, Cl. 165-164.000.

Beckmann, Leo H. J. F., to N.V. Optische Industrie "De Oude Delft". Scanning system with improved radiation energy collecting capabilities. 4,124,269, Cl. 350-6.800.

Becton, Dickinson and Company: *See*—
Nugent, Edward L., 4,124,044, Cl. 141-98.000.

Bell & Howell Company: *See*—
Axelrod, Donald J.; and Flint, John R., 4,124,290, Cl. 355-41.000.
Stump, C. Roscoe; and Van Dam, John F., Jr., 4,124,435, Cl. 156-521.000.
Zneimer, Joel E., 4,124,874, Cl. 360-121.000.

Bell Maschinenfabrik AG: *See*—
Frohn, Walter, 4,124,668, Cl. 264-40.100.

Bell, Richard L.: *See*—
Rye, Grover W.; and Bell, Richard L., 4,124,425, Cl. 156-168.000.

Bell Telephone Laboratories, Incorporated: *See*—
Carlson, John C.; and Starace, Jeremia P., 4,124,176, Cl. 242-156.000.
Dixon, Richard W.; Koszi, Louis A.; and Nash, Franklin R., 4,124,826, Cl. 331-94.50H.
Episcopo, Nicholas P., 4,124,884, Cl. 363-21.000.
Lin, Sing H.; and Yeh, Yu S., 4,124,818, Cl. 325-363.000.
Marcuse, Dietrich; and Presby, Herman M., 4,124,728, Cl. 427-8.000.
Ren, Chung-Li, 4,124,830, Cl. 333-73.00W.
Seretny, Stanley E.; and Webb, Carl E., 4,124,785, Cl. 179-103.000.
Zarouni, Alfred, 4,124,774, Cl. 179-6.30R.
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Sokolow, Nickolas N., 4,124,308, Cl. 366-77.000.

Bendix Corporation, The: *See*—
Brown, Arthur K.; Baker, Donald J.; and Jackson, Robert W., 4,123,965, Cl. 92-136.000.
Frazier, Richard V., Jr.; and Levenson, Tony, 4,124,850, Cl. 343-7.300.

Benedetti, Stefano, to Cassale, Leonardo, a part interest. Bi-directional re-entering wheel for fixed and extendible trolleys and feet. 4,123,819, Cl. 16-24.000.

Benier B.V.: *See*—
Benier, Johan, 4,124,305, Cl. 366-69.000.

Benier, Johan, to Benier B.V. Method and apparatus for rounding lumps of dough. 4,124,305, Cl. 366-69.000.

Bennett, Ronald: *See*—
Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., 4,124,437, Cl. 156-640.000.

Benno, Edward L., to Illinois Tool Works Inc. Metal can lid with a push-in opening device for cans having pressurized contents. 4,124,139, Cl. 220-268.000.

Bentley, Frank A., to NCR Corporation. Pinless hinge structure. 4,123,822, Cl. 16-128.00R.

Berchielli, Aldo S.: *See*—
Chireau, Roland F.; and Berchielli, Aldo S., 4,124,743, Cl. 429-144.000.

Berenbaum, Morris B.: *See*—
Anello, Louis G.; Berenbaum, Morris B.; Peterson, James O.; Sukornick, Bernard; and Sogn, Allen W., 4,124,606, Cl. 260-370.000.

Berens, Jack: *See*—
Berens, Stephen; and Berens, Jack, 4,124,779, Cl. 179-15.0BT.

Berens, Stephen; and Berens, Jack. Dual channel communications system particularly adapted for the AM broadcast band. 4,124,779, Cl. 179-15.0BT.

Berezovsky, Alexandr V.: *See*—
Serenkov, Vasily I.; Deev, Jury S.; Ryabov, Evgeny A.; Gorbunova, Elena V.; Tikhomirov, Vladimir S.; Dobrokhotova, Marina K.; and Berezovsky, Alexandr V., 4,124,468, Cl. 204-159.110.

Berg, Norman J.; and Karam, James T., Jr., to United States of America, Army. Acoustic-optic technique for processing many signals simultaneously. 4,124,280, Cl. 350-358.000.

Berg, Norman J.; and Udelson, Burton J., to United States of America, Army. Scheme for terminal guidance utilizing acousto-optic correlator. 4,124,281, Cl. 350-358.000.

Bergendahl, Hans-Georg, to Maschinefabrik Koppern GmbH & Co KG. Roller press for thermal compaction and thermal briquetting of loose materials. 4,123,971, Cl. 100-93.0RP.

Berger, Frank M.: *See*—
Reisner, David B.; Ludwig, Bernard J.; Fukui, George M.; and Berger, Frank M., 4,124,723, Cl. 424-311.000.

Berger, L. Joseph, Jr.; and Guequierre, Denis D., to Finite Filter Co., Inc. Coalescing demister. 4,124,360, Cl. 55-187.000.

Bergman, Walter G., to Scotty Fabricators Inc. Corrugated fiberboard and foamcore cabinet. 4,124,260, Cl. 312-107.000.

Bergstrand, Gunnar M. Pressure indicator. 4,123,945, Cl. 73-722.000.

Bergwerksverband GmbH: *See*—
Juntgen, Harald; Schumacher, Horst; Klein, Jurgen; Knoblauch, Karl; Schroter, Hans-Jurgen; Kolling, Georg; and Romey, Ingo, 4,124,529, Cl. 252-421.000.

Bernard, Vincent E., to Jimmy Dean Meat Company, Inc., The. System for extruding and forming portion controlled frozen food products. 4,124,339, Cl. 425-133.100.

Berner, Karl; Koltermann, Jurgen K. D.; and Grell, Helmut K., to Deutsche Gardner-Denver GmbH. Procedure and apparatus for screwing implants into bones. 4,124,026, Cl. 128-303.00R.

Bert, Alain, to Thomson-CSF. Surface wave device for treating signals. 4,124,828, Cl. 333-30.00R.

Berthold, Richard; and Troxler, Franz, to Sandoz Ltd. -4-Phenylhexahydro-4-indolinol derivatives. 4,124,719, Cl. 424-274.000.

Bertone, Antonino; and Rivetti, Enrico, to FIAT Societa per Azioni. Hydraulic servo assisted braking system. 4,123,908, Cl. 60-548.000.

Bertozzi, Eugene R., to Thiokol Corporation. Process for producing halogen-terminated polysulfide polymers. 4,124,645, Cl. 260-608.000.

Bess, Kenneth B., Jr.; and Alleman, Benjamin D. Blind suturing apparatus. 4,123,982, Cl. 112-169.000.

Besselere, Jean-Pierre: *See*—
Meuleman, Johannes; and Besselere, Jean-Pierre, 4,124,411, Cl. 136-89.0TF.

Bethlehem Steel Corporation: *See*—
Hughes, Charles R.; and Humphries, Darral V., 4,123,894, Cl. 57-220.000.

Bezold, Helmut, to Kraftwerk Union Aktiengesellschaft. Nuclear fuel-rod assembly support structure. 4,124,443, Cl. 176-78.000.

Bharucha, Nanabhai R.: *See*—
Loutfy, Raouf O.; and Bharucha, Nanabhai R., 4,124,460, Cl. 204-108.000.

Bialski, Alexander; Gentile, Camillo; and Sepall, Ola, to Reed Ltd. Paper sorting method. 4,124,168, Cl. 241-14.000.

Bianchetta, Donald L.; Freedy, Allan L.; and Rhodes, Sammy J., to Caterpillar Tractor Co. Hydraulic system having selective simultaneous pressure and flow control. 4,123,907, Cl. 60-445.000.

Bildinov, Konstantin N.: *See*—
Yagupolsky, Lev M.; Zavatsky, Vladimir N.; Semeny, Valery Y.; Bildinov, Konstantin N.; Serebrov, Petr V.; Goncharenko, Alevtina A.; Kirsanov, Alexandr V.; Lyapunov, Mikhail I.; and Feschenko, Ninel G., 4,124,456, Cl. 204-59.00R.

Bilyk, Alexander; Saggese, Edward J.; and Monroe, Harry A., Jr., to United States of America, Agriculture. Polyols from epoxidized tallow trimethylolpropane and propylene oxide. 4,124,609, Cl. 260-406.000.

Binns, Robert E., to Amchem Products, Inc. Method for cleaning aluminum at low temperatures. 4,124,407, Cl. 134-3.000.

Birkner, John M.; and Chua, Hua-Thye, to Monolithic Memories, Inc. Programmable array logic circuit. 4,124,899, Cl. 364-716.000.

Bischoff, Robert F., Jr. Latch bolt mechanism. 4,124,238, Cl. 292-173.000.

Bissell, Robin; and Whitefield, John T., to Bissell, Robin. Dispensing apparatus and method. 4,124,109, Cl. 194-4.00R.

Bittar, Joseph: *See*—
Doane, John Charles; and Bittar, Joseph, 4,124,102, Cl. 187-29.00R.

Biways, Inc.: *See*—
Brownlee, David A., 4,123,988, Cl. 116-133.000.

Bjelland, Ronald W.; Narwicz, Charles A.; and Hetmanski, Casimir, to United States Lines, Inc. Container liner frame support kit. 4,124,136, Cl. 220-68.000.

Black, Ian A.; and Miller, Rodney, to Counting Instruments Limited. Generation of low frequency, high voltages. 4,124,886, Cl. 363-121.000.

Black, Stephen R.; and Gibbs, Gary A., to Motorola, Inc. Analog to digital converter having a high speed subtraction circuit. 4,124,844, Cl. 340-347.0AD.

Blackmer, David E.: *See*—
Johnson, Keith O.; Blackmer, David E.; and Mosely, John deS., 4,124,784, Cl. 179-100.30R.

Blanch, Julian E.; and Majewski, Helmut W., to Stauffer Chemical Company. Process for removing mercury from brine sludges. 4,124,459, Cl. 204-99.000.

Blaser, Paul: *See*—
Schmidt, Helmut; Strobel, Walter; Treude, Gunter; and Blaser, Paul, 4,124,313, Cl. 400-491.200.

Blaser, Wayne W., to Dow Chemical Company, The. Method for uniformly coating liquid phases on glass beads and applications thereof. 4,123,931, Cl. 73-23.100.

Blaupunkt-Werke GmbH: *See*—
Hansen, Jens, 4,124,819, Cl. 325-479.000.

Blodee, Leif; Knapp, Robert L.; and Oppenhuizen, Simon W., to American Seating Company. Panel wall systems with modular component build-up. 4,123,879, Cl. 52-36.000.

Bloom, Stanley M.; Borror, Alan L.; and Huyffer, Paul S., to Polaroid Corporation. Bis-indolyl phthalides and naphthalides. 4,124,592, Cl. 260-326.12R.

Blue, Archie H., to Wood, Ross Derisley; Edgar, Roland; Taylor, Alec Henry; and Pyke, Margaret Elizabeth. Electrolytic cell. 4,124,463, Cl. 204-129.000.

Blumbergs, John H.; and Scholer, Fred R., to FMC Corporation. Organophosphorus azides as peroxygen activators. 4,124,356, Cl. 8-111.000.

Bluzer, Nathan, to Westinghouse Electric Corp. Overlapping electrode structure for solid state devices. 4,123,834, Cl. 29-578.000.

Bock, Manfred; Pedain, Josef; Uerdingen, Walter; and Schonfelder, Manfred, to Bayer Aktiengesellschaft. Process for the preparation of polyisocyanates containing urethane and biuret groups. 4,124,569, Cl. 528-61.000.

Boelens, Harmannus; and Wobben, Hendrik J., to Naarden International, N.V. 8-Allyl-8-hydroxytricyclo-[5,2,1,$0^{2,6}$] decane. 4,124,771, Cl. 568-817.000.

Bollinger, Frederic G.; D'Amico, John J.; and Hansen, Dale J., to Monsanto Company. Substituted phthalimides for regulating the growth of plants. 4,124,375, Cl. 71-96.000.

Bom, Cornelis J. G.: *See*—
van der Lely, Cornelis; van der Lely, Ary; and Bom, Cornelis J. G., 4,124,078, Cl. 172-59.000.

Bomchil, Guillermo; Buiguez, Francois; Galzin, Sylvie; Monfret, Alain;

and Peccoud, Louise, to Commissariat a l'Energie Atomique. Method and apparatus for controlling the deposition of films by reactive sputtering. 4,124,474, Cl. 204-192.00R.
Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., to Buckbee-Mears Company. System for etching patterns of small openings on a continuous strip of metal. 4,124,437, Cl. 156-640.000.
Bonnet, Yves; and Mabile, Michel, to Commissariat a l'Energie Atomique. Pressurization apparatus with an intermediate reserve vessel. 4,124,067, Cl. 165-107.00D.
Bonney, Roland W. Multiway hydraulic valve. 4,124,038, Cl. 137-596.200.
Bordak, John A.: *See—*
Kumbera, David G.; and Bordak, John A., 4,124,790, Cl. 200-144.00B.
Borg-Warner Corporation: *See—*
Clauss, Julius A., 4,124,106, Cl. 192-3.310.
Fogelberg, Mark J., 4,124,085, Cl. 180-49.000.
Posega, Paul, Jr., 4,123,905, Cl. 60-361.000.
Wayman, Robert W., 4,123,952, Cl. 74-781.00R.
Wentworth, Robert S., Jr., 4,124,218, Cl. 277-1.000.
Borner, Paul; and Isensee, Hans-Jorg, to Nukem GmbH. Process for working up uranium-thorium wastes. 4,124,525, Cl. 252-301.10W.
Borror, Alan L.: *See—*
Bloom, Stanley M.; Borror, Alan L.; and Huyffer, Paul S., 4,124,592, Cl. 260-326.12R.
Bortfeld, David P.; Cohen, Roger W.; and de Wolf, David A., to RCA Corporation. Electron gun having a distributed electrostatic lens. 4,124,810, Cl. 315-15.000.
Bortfeld, Manfred, to Bayerische Motoren Werke Aktiengesellschaft. Activating devices for passenger restraining systems in vehicles. 4,124,087, Cl. 180-91.000.
Boss, Arthur E., to Ethicon, Inc. Controlled release sutures. 4,124,027, Cl. 128-339.000.
Bosselaar, Hendrik; and Oltmans, Frank, to Shell Oil Company. Apparatus for measuring internal corrosion in pipelines. 4,123,847, Cl. 33-178.00E.
Bost, John D.: *See—*
Williams, Tudor; and Bost, John D., 4,124,365, Cl. 65-22.000.
Boulton, Thomas W., to Imperial Chemical Industries Limited. Bipolar unit. 4,124,479, Cl. 204-256.000.
Bowers, Kenneth. Surface finish monitor. 4,124,803, Cl. 250-559.000.
Bowman, Edward E.: *See—*
Perez, Arthur; and Bowman, Edward E., 4,123,914, Cl. 62-196.00B.
Boyars, Carl, to United States of America, Navy. Insensitive ammonium nitrate. 4,124,368, Cl. 71-59.000.
Brackman, Donald A.; and Athey, Stuart E., to Hobart Corporation. Food processing apparatus. 4,124,310, Cl. 366-314.000.
Bramson, Harvey G.; and Ying, Charles W., to Atex Corporation. Multi-lingual input keyboard and display. 4,124,843, Cl. 340-337.000.
Brandes, Wilhelm: *See—*
Kramer, Wolfgang; Draber, Wilfried; Buchel, Karl H.; Brandes, Wilhelm; and Lurssen, Klaus, 4,124,369, Cl. 71-76.000.
Brauer, Hans, to Friedrich Kocks GmbH & Co. Rolling mill. 4,123,927, Cl. 72-16.000.
Braun, Ernst; and Braun, Gert, to Halbach & Braun. Horizontal-type single toggle jaw breaker. 4,124,170, Cl. 241-265.000.
Braun, Gert: *See—*
Braun, Ernst; and Braun, Gert, 4,124,170, Cl. 241-265.000.
Braun, Karl; and Tussetschlager, Reinhold, to Messerschmitt-Bolkow-Blohm GmbH. Control valve, particularly for pulsating rocket engines. 4,124,195, Cl. 251-333.000.
Breadco Services Limited: *See—*
Miller, Donald A., 4,124,016, Cl. 126-21.00A.
Bredeson, Dean K.; Craig, Gregory C.; Gilius, William J.; and Johnson, Charles R., to French Oil Mill Machinery Company, The. Vent for devolatilizing screw press. 4,124,306, Cl. 366-75.000.
Bregazzi, Terence W.: *See—*
Roddy, Patrick; Downes, George W.; Searle, John V.; and Bregazzi, Terence W., 4,123,943, Cl. 73-623.000.
Breisch, John H., to Jonvin Corporation. Work-supporting device. 4,124,093, Cl. 182-181.000.
Breslow, Jeffrey D.; Spinello, John O.; and Jaworski, Eugene, to Marvin Glass & Associates. Game apparatus. 4,124,207, Cl. 273-1.00R.
Brettschneider, Johannes: *See—*
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Breuer, Hermann: *See—*
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Bridgestone Tire Co., Ltd.: *See—*
Watabe, Yoji; Ishii, Michio; Kaneda, Hiroshi; Ino, Fumitaka; Kuwano, Masao; Ura, Yasuyuki; and Anzai, Shiro, 4,124,573, Cl. 528-53.000.
Bright, Gene M., to Pfizer Inc. 11-Alkanoyl-4''-deoxy-4''-isonitriloleandomycin derivatives. 4,124,755, Cl. 536-9.000.
British Petroleum Company Limited, The: *See—*
Finigan, Arthur; and Webb, Michael G., 4,123,911, Cl. 405-68.000.
Brock, Norbert: *See—*
Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, 4,124,716, Cl. 424-267.000.
Brokke, Mervin E.: *See—*
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Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,124,376, Cl. 71-118.000.
Bronstein-Bonte, Irena Y.; and Taylor, Lloyd D., to Polaroid Corporation. Ammonium mordants for photographic dyes. 4,124,388, Cl. 96-29.00D.
Brooks & Perkins, Incorporated: *See—*
Mollon, Leslie, 4,124,445, Cl. 176-87.000.
Brown, Arthur K.; Baker, Donald J.; and Jackson, Robert W., to Bendix Corporation, The. Rack and pinion power steering gear. 4,123,965, Cl. 92-136.000.
Brown, Harold B., to Burroughs Corporation. Self locking door opening device and assembly. 4,123,821, Cl. 16-114.00R.
Brown, Jack, to Singer Company, The. Needle feed on electronic sewing machine. 4,123,981, Cl. 112-158.00E.
Brown, William J.; and Molloy, Gerald F., to Caterpillar Tractor Co. Vehicle cab mounting. 4,124,246, Cl. 296-28.00C.
Brownlee, David A., to Biways, Inc. Road condition indicator device. 4,123,988, Cl. 116-133.000.
Brumley, Charles D.; Fancher, Alex, Jr.; and Lee, Paul L., to United States of America, Army. Continuous process for pelleting explosive compositions. 4,124,663, Cl. 264-3.00D.
Bruns, Klaus: *See—*
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Bryant, John G. Protective pads for overhead lifting. 4,124,244, Cl. 294-74.000.
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Buchi, George H.; and Hauser, Arnold, to Firmenich, S.A. 6,6,7-Trimethyl-tricyclo[5.2.2.$0^{1,5}$]undec-8-en-2-one. 4,124,642, Cl. 260-586.00G.
Buckbee-Mears Company: *See—*
Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., 4,124,437, Cl. 156-640.000.
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Buckell, Raymond A., to Buckell Engineering Company, Limited. Machine having fluid passages. 4,123,836, Cl. 29-156.4WL.
Budapesti Muszaki Egyetem: *See—*
Anka, Mihaly; Lukacs, Peter; Gallo, Dezso; Szabics, Jozsef; and Szalay, Geza, 4,124,416, Cl. 148-13.000.
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Buffalo Color Corporation: *See—*
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Bomchil, Guillermo; Buiguez, Francois; Galzin, Sylvie; Monfret, Alain; and Peccoud, Louise, 4,124,474, Cl. 204-192.00R.
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Petersen, Warren D., 4,124,251, Cl. 297-445.000.
Burke, Ralph B. Energy and fuel conserving unit heater. 4,124,178, Cl. 237-19.000.
Burns, Charles E., to Numerical Control, Inc. Hockey stick construction. 4,124,208, Cl. 273-67.00A.
Burroughs Corporation: *See—*
Barasch, Stephen, 4,124,286, Cl. 355-3.00R.
Brown, Harold B., 4,123,821, Cl. 16-114.00R.
Sung, Benjamin T.; and Lumpkin, Richard C., 4,124,121, Cl. 209-583.000.
Burton, Robert E. Knockdown spring unit. 4,124,201, Cl. 267-99.000.
Buschor, Josef J., to Nolex Corporation. Carton forming apparatus. 4,123,966, Cl. 93-49.00R.
Bush, Sydney J. Ophthalmic lenses. 4,124,282, Cl. 351-168.000.
Byles, William R., to Hughes Aircraft Company. Reflector focused light trap for a liquid crystal display. 4,124,279, Cl. 350-345.000.
Byrd, Carlisle O., Jr., to Johns-Manville Corporation. Refractory fiber blanket module with increased insulation. 4,123,886, Cl. 52-509.000.
C. van der Lely N.V.: *See—*
van der Lely, Cornelis; van der Lely, Ary; and Bom, Cornelis J. G., 4,124,078, Cl. 172-59.000.
Cahill, William J., Jr. Remotely controlled utility service interrupter system and apparatus. 4,124,835, Cl. 337-1.000.
Call, Gerald A., Sr. Furniture angle brace and joint formed therewith. 4,124,186, Cl. 248-188.000.
Camerman, Philippe J. A., to Cosden Technology, Inc. Devolatilization of styrene polymers with sulfonylhydrazides. 4,124,658, Cl. 260-880.00R.
Canadian D. A. Stuart Oil Co. Limited: *See—*
Scherf, Gerhard W. H., 4,124,641, Cl. 568-601.000.
Canadian Industries Limited: *See—*
Fung, David T.; Laberge, J. G. Jacques; and Przystal, Frederick S., 4,124,492, Cl. 208-180.000.
Cande, Donald P. Portable platform device. 4,124,094, Cl. 182-187.000.
Canner, Herman M., to Sterling Detroit Company. Method and apparatus for loading presses. 4,124,242, Cl. 294-61.000.
Canon Kabushiki Kaisha: *See—*
Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, 4,124,296, Cl. 355-75.000.
Tanaka, Kazuo; and Takeshi, Kunio, 4,124,274, Cl. 350-184.000.

Uchidoi, Masanori; Miyakawa, Hideaki; Aizawa, Hiroshi; Yamamichi, Masayoshi; Ohshima, Osamu; and Tunekawa, Tokuichi, 4,124,855, Cl. 354-24.000.

Canova, Roland. Cellular structure for the cultivation of plants. 4,123,873, Cl. 47-83.000.

Capetanopoulos, Constantine, to Ecolotrol, Inc. Gas transfer system. 4,124,508, Cl. 210-194.000.

Caramagne, Hugo. Phantom coil cover for automobiles. 4,124,089, Cl. 180-114.000.

Carborundum Company, The: *See—*
Coppola, John A.; Hailey, Laurence N.; and McMurtry, Carl H., 4,124,667, Cl. 264-29.500.

Carl Vieler, Firma: *See—*
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Carlson, Edwin S.: *See—*
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Carlson, John C.; and Starace, Jeremia P., to Western Electric Company; and Bell Telephone Laboratories, Incorporated. Self-tensioning reel. 4,124,176, Cl. 242-156.000.

Carr, Norman L.; and McGinnis, Edgar L., to Gulf Research & Development Company. Separation of solids from coal liquids with an additive blend. 4,124,485, Cl. 208-8.000.

Carter-Wallace, Inc.: *See—*
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Carver Foundry Products: *See—*
Abraham, Edward D., 4,124,126, Cl. 214-1.00Q.

Case, James E.; Ruppert, Richard L.; and Manning, Lindley. Method of and apparatus for erectign concrete wall panels. 4,123,882, Cl. 52-125.000.

Casensky, Bohuslav; Machacek, Jiri; Kriz, Otomar; and Kubanek, Vladimir, to Ceskoslovenska akademie ved. Process of manufacturing sodium lactamoaluminates. 4,124,584, Cl. 260-239.30R.

Cashman, Richard D. Door alarm system. 4,124,847, Cl. 340-545.000.

Cassale, Leonardo: *See—*
Benedetti, Stefano, 4,123,819, Cl. 16-24.000.

Castellani, Americo: *See—*
Leone, Miguel A.; and Castellani, Americo, 4,124,220, Cl. 277-162.000.

Catania, Salvatore J. Macrame-making stand. 4,124,237, Cl. 289-18.000.

Caterpillar Mitsubishi Ltd.: *See—*
Kohriyama, Yoshimasa, 4,124,255, Cl. 305-41.000.

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Bianchetta, Donald L.; Freedy, Allan L.; and Rhodes, Sammy J., 4,123,907, Cl. 60-445.000.
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Clarke, John M., 4,124,060, Cl. 418-94.000.
Durgan, Virgil R. C.; Harper, Robert W.; and Ritter, Arthur J., Jr., 4,123,906, Cl. 60-403.000.
Grawey, Charles E., 4,124,053, Cl. 152-349.000.
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Reed, Robert D.; Hart, Wallace F.; and Cegielski, John M., 4,124,681, Cl. 423-210.000.

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Adams, Albert A.; Balogh, Karoly G.; and Prugh, Tommy J., 4,124,128, Cl. 214-6.0DK.

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Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; Nemec, Pavel; Katzer, Josef; and Stastny, Karel, 4,124,544, Cl. 521-26.000.

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Reynolds, Charles B.; and Summers, Thomas O., 4,124,090, Cl. 181-121.000.

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Geen, Henry C.; Vinton, Clarence S.; and Torbet, Christopher J., 4,124,691, Cl. 423-449.000.

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Foulkes, Stanley Charles, 4,124,042, Cl. 141-1.100.

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Sudworth, James L., 4,124,739, Cl. 429-61.000.

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Strong, Herbert M.; Chrenko, Richard M.; and Tuft, Roy E., 4,124,690, Cl. 423-446.000.

Christenson, Lowell B. Apparatus and method of assisting pile driving by electro-osmosis. 4,124,483, Cl. 204-299.00R.

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Birkner, John M.; and Chua, Hua-Thye, 4,124,899, Cl. 364-716.000.

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Alterman, David S.; and Chun, Kil W., 4,124,734, Cl. 428-403.000.

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Green, George E.; Stark, Bernard P.; and Waterhouse, John S., 4,124,760, Cl. 542-432.000.
Gschwend, Heinz W.; and Hillman, Malvin J., 4,124,593, Cl. 260-326.00N.
Lohmann, Dieter; Furrer, Peter; Darms, Roland; and Greber, Gerd, 4,124,651, Cl. 260-857.0PA.

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Lizotte, Robert H., 4,123,878, Cl. 51-165.870.

Cislak, Raymond S., to Gateway Industries, Inc. Retractor with tension relieving mechanism. 4,124,175, Cl. 242-107.700.

Ciurca, Samuel J., Jr.; and Kohrt, Carl F., to Eastman Kodak Company. Thiyl bleaching agents for photographic processes. 4,124,398, Cl. 96-114.100.

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Baker, William B.; and Clark, Donald G., 4,123,932, Cl. 73-28.000.

Clark Equipment Company: *See—*
Albright, Larry E.; and Bauer, James J., 4,124,084, Cl. 180-6.480.

Clark, James B., to Parker-Hannifin Corporation. Hose coupling. 4,124,234, Cl. 285-247.000.

Clark, Robert V.; Linder, Francis X.; and Taylor, William R., to Automation Industries, Inc. Range limited area protection system. 4,124,848, Cl. 340-524.000.

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Greenhalgh, Colin W.; Newton, David F.; Budziarek, Richard; and Clarke, Howard, 4,124,355, Cl. 8-2.50A.

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Cleaver, Harriet W. G., personal representative: *See—*
Leitner, Gordon F.; Wiegratz, Fred G.; Cleaver, John C., deceased; Cleaver, Laird C., personal representative; and First Wisconsin Trust Company, 4,124,065, Cl. 165-95.000.

Cleaver, John C., deceased: *See—*
Leitner, Gordon F.; Wiegratz, Fred G.; Cleaver, John C., deceased; Cleaver, Laird C., personal representative; and First Wisconsin Trust Company, 4,124,065, Cl. 165-95.000.

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Leitner, Gordon F.; Wiegratz, Fred G.; Cleaver, John C., de ceased; Cleaver, Laird C., personal representative; and First Wisconsin Trust Company, 4,124,065, Cl. 165-95.000.

Clesid S.A.: *See—*
Antoine, Lucien; Maubon, Andre; and Largeron, Gerard, 4,124,200, Cl. 266-158.000.

Coats & Clark, Inc.: *See—*
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Coburn, Orin W.: *See—*
Hovorka, Jiri J., 4,124,110, Cl. 194-100.00A.

Cohen, Joseph; and Adjemian, Alain, to Aluminum Pechiney. Method of obtaining pure alumina by acid attack on aluminous minerals containing other elements. 4,124,680, Cl. 423-126.000.

Cohen, Murray F. Electro-optical method and system especially suited for remote meter reading. 4,124,839, Cl. 340-151.000.

Cohen, Roger W.: *See—*
Bortfeld, David P.; Cohen, Roger W.; and de Wolf, David A., 4,124,810, Cl. 315-15.000.

Coleman, Clyde F., to RCA Corporation. Video disc insertion/extraction system for a video disc player. 4,124,866, Cl. 358-128.000.
Coleman, Robert E. Material spreader for mounting on a vehicle. 4,124,167, Cl. 239-673.000.
Colgate-Palmolive Company: *See—*
Fischer, Charles F., 4,124,348, Cl. 425-297.000.
Collins, Donald L.: *See—*
Rohrs, Donald L.; Collins, Donald L.; and Downing, Harold A., 4,124,130, Cl. 214-75.00R.
Collins, Harold B.: *See—*
Marason, Gabriel, Jr.; and Collins, Harold B., 4,124,215, Cl. 274-1.00A.
Collins Industries, Inc.: *See—*
Rohrs, Donald L.; Collins, Donald L.; and Downing, Harold A., 4,124,130, Cl. 214-75.00R.
Collins, Thomas A.; and Voss, Andrew P., to Atlantic Richfield Company. Hydrocarbon reforming process. 4,124,490, Cl. 208-139.000.
Colman, Robert, to Metaframe Corporation. Aquarium water heater. 4,124,793, Cl. 219-523.000.
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French, Charles T., 4,123,909, Cl. 60-646.000.
Mitchell, Robert D., 4,124,338, Cl. 425-78.000.
Commissariat a l'Energie Atomique: *See—*
Bomchil, Guillermo; Buiguez, Francois; Galzin, Sylvie; Monfret, Alain; and Peccoud, Louise, 4,124,474, Cl. 204-192.00R.
Bonnet, Yves; and Mabile, Michel, 4,124,067, Cl. 165-107.00D.
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Guise, Geoffrey B., 4,124,553, Cl. 260-29.2TN.
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Kaufman, Phillip A.; and Washburn, Jerry R., 4,124,889, Cl. 364-200.000.
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Confalone, Pasquale N.; Lollar, Elizabeth D.; Pizzolato, Giacomo; and Uskokovic, Milan R., to Hoffmann-La Roche Inc. Synthesis of biotin. 4,124,595, Cl. 260-332.20A.
Conrad, Jens; Schaper, Ulf-Armin; and Bruns, Klaus, to Henkel Kommanditgesellschaft auf Aktien. Dioxa bicyclo dodecane and -hexadecane perfume compositions. 4,124,541, Cl. 252-522.000.
Conroy, Alan P.: *See—*
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Consiglio, Aldo J.: *See—*
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Container Corporation of America: *See—*
Beck, Robert E., 4,124,158, Cl. 229-15.000.
Cook, Edward H., Jr.: *See—*
Tokawa, Daniel T.; Mentz, Bernardus J.; Eng, Jeffrey D.; Cook, Edward H., Jr.; and Marks, Gerald R., 4,124,477, Cl. 204-252.000.
Cook, Leslie J.; Forrester, Alvin T.; Mahoney, John F.; Perel, Julius; and Vickers, Kenneth E., to Phrasor Technology Incorporated. Apparatus and process for separating materials. 4,124,801, Cl. 250-288.000.
Cooper, Earl A., to Automation Industries, Inc. Method of making frequency shielding means for an electrical connector. 4,123,842, Cl. 29-592.00R.
Copal Company Limited: *See—*
Shigeru, Yasuo; and Kurosu, Tomio, 4,124,283, Cl. 352-91.00C.
Coppola, Gary M.: *See—*
Hardtmann, Goetz E.; and Coppola, Gary M., 4,124,588, Cl. 546-21.000.
Coppola, John A.; Hailey, Laurence N.; and McMurtry, Carl H., to Carborundum Company, The. Process for producing sintered silicon carbide ceramic body. 4,124,667, Cl. 264-29.500.
Corbacho, Hipolito, Jr. Ratchet wrench. 4,123,953, Cl. 81-60.000.
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Westlin, Karl L.; and Cork, Herbert V., Jr., 4,124,362, Cl. 55-509.000.
Cornia, Richard P.: *See—*
Reed, Russell, Jr.; Meyer, Robert E.; Shaw, Graham C.; and Cornia, Richard P., 4,124,418, Cl. 149-7.000.
Cosden Technology, Inc.: *See—*
Camerman, Philippe J. A., 4,124,658, Cl. 260-880.00R.
Cost, John C., to Valeron Corporation, The. Cutting insert with raised cutting edge. 4,124,326, Cl. 407-114.000.
Coulombe, Lionel J., to Singer Company, The. Thread tension discs. 4,123,984, Cl. 112-254.000.
Counting Instruments Limited: *See—*
Black, Ian A.; and Miller, Rodney, 4,124,886, Cl. 363-121.000.
Coval, Myer L. Method of producing intravenously injectable gamma globulin. 4,124,576, Cl. 260-112.00B.
Covington, William P., to National Car Rental System, Inc. Lightweight, disposable transportation casket. 4,123,831, Cl. 27-2.000.
Cowan, Everett C., Jr.; and Margerum, Edwin O., to Sperry Rand Corporation. Adjustable feed clearance means for axial flow type combine. 4,124,032, Cl. 130-27.00T.
Craig, Gregory C.: *See—*
Bredeson, Dean K.; Craig, Gregory C.; Gilius, William J.; and Johnson, Charles R., 4,124,306, Cl. 366-75.000.
Crane Packing Co.: *See—*
Henzl, Jerry, 4,124,676, Cl. 264-250.000.
Crankshaw, Michael, to Label-Aire Inc. Label applicator with belt transport. 4,124,429, Cl. 156-364.000.
Cremer, Hans H.: *See—*
Samuel, Alan J.; Loss, Alan M.; and Cremer, Hans H., 4,124,001, Cl. 123-41.120.
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Pere, Gerard, 4,123,877, Cl. 51-165.900.
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Antoine, Lucien; Maubon, Andre; and Largeron, Gerard, 4,124,200, Cl. 266-158.000.
Crise, George W. Pressure-responsive variable length connecting rod. 4,124,002, Cl. 123-78.00E.
Croon & Lucke Maschinenfabrik GmbH & Co., KG: *See—*
Lucke, Florian, 4,124,171, Cl. 242-2.000.
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Battarel, Claude, 4,124,901, Cl. 365-88.000.
Crow, Harold J. Driven implement connected to rockable motor of a vehicle. 4,124,079, Cl. 172-114.000.
Cummings, Donald R. Separation of multi-component mixtures. 4,124,496, Cl. 208-361.000.
Cuno Melcher KG ME-Sportwaffen, Firma: *See—*
Wiethoff, Gunter, 4,123,866, Cl. 42-77.000.
Curtis, Richard E.; Dench, Robert H.; and Dervin, Victor J., to NPI Corporation. Produce cooler. 4,123,917, Cl. 62-309.000.
Cutler, Earl F., to Cutler Repaving, Inc. Asphalt pavement recycling apparatus. 4,124,325, Cl. 404-75.000.
Cutler Repaving, Inc.: *See—*
Cutler, Earl F., 4,124,325, Cl. 404-75.000.
Cyclops Corporation: *See—*
Scott, Harley D., 4,123,885, Cl. 52-483.000.
Cyprus Metallurgical Processes Corporation: *See—*
Peters, Mark A.; and Kazel, William G., 4,124,379, Cl. 75-118.00R.
Dahms, Harald. Method and apparatus for electrophoresis. 4,124,470, Cl. 204-180.00R.
Daikin Kogyo Kabushiki Kaisha: *See—*
Hisamoto, Iwao; Maeda, Chiaki; Deguchi, Takayuki; Omure, Yukio; and Onishi, Takasi, 4,124,517, Cl. 252-89.0DC.
Daimler-Benz Aktiengesellschaft: *See—*
Weinich, Manfred, 4,124,250, Cl. 297-335.000.
Dalgoutte, David G., to International Standard Electric Corporation. Method for making glass sleeve fiber splice. 4,124,364, Cl. 65-4.00B.
D'Amico, John J.: *See—*
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Damour, Lawrence R. Expanding outer sleeve for a mandrel or chuck. 4,124,173, Cl. 242-72.009.
Dana Corporation: *See—*
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Danielmeyer, Hans-Gunter; Jeser, Jean-Pierre; Kruhler, Walter W.; Schonherr, Erich; and Huber, Gunter, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Neodymium ultraphosphates and process for their preparation. 4,124,524, Cl. 252-301.10R.
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Darlington, Rex F. Grip mount for a compound bow. 4,124,014, Cl. 124-88.000.
Darms, Roland: *See—*
Lohmann, Dieter; Furrer, Peter; Darms, Roland; and Greber, Gerd, 4,124,651, Cl. 260-857.0PA.
Dart, Larry K.; and Stalder, Richard L., to International Telephone and Telegraph Corporation. Rotating signal light. 4,124,880, Cl. 362-35.000.
Daskalov, Hristo P.: *See—*
Georgiev, Atanas G.; and Daskalov, Hristo P., 4,124,583, Cl. 260-239.00D.
Daugherty, Donald A.: *See—*
Simmons, John H.; and Daugherty, Donald A., 4,123,876, Cl. 51-34.00D.
Dauth, Michael F., to Metalworks Limited. Coupling means. 4,124,317, Cl. 403-8.000.
Day, Robert H., to ITW Limited. Thin-walled cups capable of nesting. 4,124,120, Cl. 206-519.000.
Dayco Corporation: *See—*
Hollaway, Gerald C., Jr., 4,123,946, Cl. 74-231.00P.
Dayton-Walther Corporation: *See—*
Lozada, Vicente M.; Walther, William D.; and Welp, Lawrence J., 4,124,225, Cl. 280-763.000.
DBX, Inc.: *See—*
Johnson, Keith O.; Blackmer, David E.; and Mosely, John deS., 4,124,784, Cl. 179-100.30R.
de Laval Separator Company, The: *See—*
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Deev, Jury S.: *See—*
Serenkov, Vasily I.; Deev, Jury S.; Ryabov, Evgeny A.; Gorbunova, Elena V.; Tikhomirov, Vladimir S.; Dobrokhotova, Marina K.; and Berezovsky, Alexandr V., 4,124,468, Cl. 204-159.110.
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Deguchi, Takayuki: *See—*
Hisamoto, Iwao; Maeda, Chiaki; Deguchi, Takayuki; Omure, Yukio; and Onishi, Takasi, 4,124,517, Cl. 252-89.0DC.

Deike, Robert F., to Foresight Industries. Post driving machine. 4,124,081, Cl. 173-28.000.

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Zetter, Mark S.; and Micko, Eric S., 4,124,475, Cl. 204-195.00R.

Del Rosso, Victor: *See—*
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Demag, A.G.: *See—*
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Dench, John E.; and Seven, Manfred K., to Allied Chemical Corporation. Process for the preparation of ethylene polymer telomer waxes employing non-toxic 2-t-butylazo-2-cyanobutane at about 140° C giving high production rates and lower reactor fouling. 4,124,753, Cl. 526-208.000.

Dench, Robert H.: *See—*
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Denk, Edward G., to Polaroid Corporation. Diffusion transfer color products and processes employing silver halide grains comprising iodide. 4,124,383, Cl. 96-3.000.

Denman, Gail M.: *See—*
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Derner, William J.; and Spalding, Ronald P., to FMC Corporation. Bearing housing. 4,124,257, Cl. 308-194.000.

Dervin, Victor J.: *See—*
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Descamps, Marcel; and Areschka, Alex, to Labaz. Acetamidoxime derivatives and use thereof. 4,124,710, Cl. 424-248.560.

de Senneville, Bernard, to Nadella. Combined radial and axial bearing. 4,124,256, Cl. 308-174.000.

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Deutsche Gardner-Denver GmbH: *See—*
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Knorre, Helmut; Langer, Manfred; and Fischer, Wolfgang, 4,124,406, Cl. 106-111.000.

Devine, Michael J. Spot cleaning composition for carpets and the like. 4,124,542, Cl. 252-546.000.

DeVries, Robert C.: *See—*
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DeWitt, Marion A., to Goodyear Tire & Rubber Company, The. Method of building a tire with unequal bead diameters. 4,124,679, Cl. 264-326.000.

de Wolf, David A.: *See—*
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Leitert, Frederick C.; and Vinson, Carl G., Jr., 4,124,534, Cl. 252-441.000.
Lieb, Donald F.; and Sugano, Thomas T., 4,124,471, Cl. 204-180.00P.

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Dieck, Ronald L.; and Magnusson, Alan B., to Armstrong Cork Company. Catalytic process for the preparation of phosphazene polymers. 4,124,567, Cl. 528-168.000.

Diehl, Robert E.: *See—*
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Diehr, Hans-Joachim: *See—*
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Diels, Paul C. Counterweight shell for clocks. 4,123,898, Cl. 58-129.000.

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DiLeo, Philip F. Tennis racquet with insert. 4,124,209, Cl. 273-73.00L.

Dilo, Richard, to Rontex America Inc. Needled non-woven tubing. 4,124,731, Cl. 428-36.000.

Dimensional Development Corp.: *See—*
Lo, Allen K. W.; and Nims, Jerry C., 4,124,291, Cl. 355-22.000.

Ditges, Gunter: *See—*
Windelbandt, Herbert; and Ditges, Gunter, 4,123,899, Cl. 59-27.000.

Dix, Kurt; and Hoffmann, Werner, to G. Wolff Jr. Kommanditgesellschaft. Closure for a coking chamber of a coking oven. 4,124,451, Cl. 202-248.000.

Dixon, Richard W.; Koszi, Louis A.; and Nash, Franklin R., to Bell Telephone Laboratories, Incorporated. Current confinement in semiconductor lasers. 4,124,826, Cl. 331-94.50H.

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Shieu, Mark S. D.; Laugesen, Ronald C.; and Dobkin, Robert C., 4,124,808, Cl. 307-362.000.

Dobrokhotova, Marina K.: *See—*
Serenkov, Vasily I.; Deev, Jury S.; Ryabov, Evgeny A.; Gorbunova, Elena V.; Tikhomirov, Vladimir S.; Dobrokhotova, Marina K.; and Berezovsky, Alexandr V., 4,124,468, Cl. 204-159.110.

Dore, James E., to Swiss Aluminium Ltd. Method for the filtration of molten metal in a crucible type furnace. 4,124,506, Cl. 210-69.000.

Dorrity, Jordan L.: *See—*
Mead, Donald C.; Kasdan, Harvey L.; and Dorrity, Jordan L., 4,124,300, Cl. 356-429.000.

Doss, Tim W.: *See—*
Greenwood, Alan; and Doss, Tim W., 4,124,346, Cl. 425-188.000.

Dow Chemical Company, The: *See—*
Blaser, Wayne W., 4,123,931, Cl. 73-23.100.
Hoornstra, Clayton W.; and Stevens, Violete L., 4,124,389, Cl. 96-35.100.

Dow Corning Corporation: *See—*
Johnson, Robert D., 4,124,523, Cl. 252-145.000.

Downes, George W.: *See—*
Roddy, Patrick; Downes, George W.; Searle, John V.; and Bregazzi, Terence W., 4,123,943, Cl. 73-623.000.

Downing, Harold A.: *See—*
Rohrs, Donald L.; Collins, Donald L.; and Downing, Harold A., 4,124,130, Cl. 214-75.00R.

Draber, Wilfried: *See—*
Kramer, Wolfgang; Draber, Wilfried; Buchel, Karl H.; Brandes, Wilhelm; and Lurssen, Klaus, 4,124,369, Cl. 71-76.000.

Dressler, Mirko; Staud, Vaclav; Skapa, Miroslav; and Stejskal, Miroslav, to Vyzkumny ustav Lesniho Hospodarstvi a myslivosti. Arrangement for harvesting timber. 4,124,047, Cl. 144-3.00D.

Druetzler, Thomas W.: *See—*
Mathai, John; and Druetzler, Thomas W., 4,124,551, Cl. 260-23.0AR.

Dshkhunian, Valery L.: *See—*
Vasenkov, Alexandr A.; Dshkhunian, Valery L.; Mashevich, Pavel R.; Nesterov, Petr V.; Telenkov, Vyacheslav V.; Chicherin, Jury E.; and Juditsky, Davlet I., 4,124,890, Cl. 364-200.000.

D'Silva, Themistocles D. J., to Union Carbide Corporation. Pesticidal unsymmetrical bis-arylcarbamate sulfide compounds containing a 2,3, dehyrobenzofuran group. 4,124,721, Cl. 424-285.000.

DSO "Pharmachim": *See—*
Georgiev, Atanas G.; and Daskalov, Hristo P., 4,124,583, Cl. 260-239.00D.

Dubin, Robert R., to Electric Power Research Institute, Inc. Sodium-sulfur battery. 4,124,740, Cl. 429-104.000.

Duch, Eduard: *See—*
Fischer, Johann P.; Cavagna, Friedrich; Duch, Eduard; and Muck, Karl-Friedrich, 4,124,751, Cl. 526-82.000.

Dudynskyj, Peter P.; Kline, Daniel L.; and Hogan, James T., to General Motors Corporation. Wheelchair lift device. 4,124,096, Cl. 187-9.00R.

Dudynskyj, Peter P., to General Motors Corporation. Wheelchair lift device. 4,124,098, Cl. 187-9.00R.

Dudynskyj, Peter P., to General Motors Corporation. Wheelchair lift device. 4,124,099, Cl. 187-9.00R.

Dulux Australia Ltd.: *See—*
Gillan, John; and Lubbock, Frederick J., 4,124,548, Cl. 260-17.00R.

Dunn, Bruce S., to General Electric Company. Composite solid electrolyte body. 4,124,744, Cl. 429-193.000.

Dunwald, Willi: *See—*
Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, 4,124,568, Cl. 528-59.000.

Du Pont de Nemours, E. I., and Company: *See—*
Abele, Werner; Pistor, Wolfgang; Schmidt, Manfred; Smith, Harry O.; and Spannhake, Nils, 4,124,397, Cl. 96-109.000.
Baker, William B.; and Clark, Donald G., 4,123,932, Cl. 73-28.000.
Centa, John M., 4,124,384, Cl. 96-14.000.
Jenkins, Colle L., Jr., 4,124,600, Cl. 260-346.110.
Miller, Kenneth L., 4,124,754, Cl. 526-220.000.
Whitlock, Kenneth H., 4,124,653, Cl. 260-873.000.
Wolf, Anthony D., 4,124,373, Cl. 71-92.000.
Wolf, Anthony D., 4,124,374, Cl. 71-92.000.

Durant, Graham J.; Emmett, John C.; Ganellin, Charon R.; and Prain, Hunter D., to Smith Kline & French Laboratories Limited. Thiazolyl alkylaminoethylene compounds. 4,124,717, Cl. 424-270.000.

Durgan, Virgil R. C.; Harper, Robert W.; and Ritter, Arthur J., Jr., to Caterpillar Tractor Co. Vehicle having portable power means for brake control. 4,123,906, Cl. 60-403.000.

Durkoppwerke GmbH: *See—*
Konersmann, Alwin, 4,123,986, Cl. 112-289.000.

Dusseau, Charles H. V.: *See*—
Mijs, Willem J.; Dusseau, Charles H. V.; and Sinnige, Hermannus J. M., 4,124,763, Cl. 544-219.000.

Dutta, Anand S.; and Giles, Michael B., to Imperial Chemical Industries Limited. Luliberin analogs. 4,124,703, Cl. 424-177.000.

Dworkin, Robert D.; and Ejk, Adam J., to M&T Chemicals Inc. Method for preparing bis(organotin mercaptoalkanol ester) sulfides. 4,124,618, Cl. 260-410.600.

Dworkis, Ronald. Ignition switch lock. 4,123,924, Cl. 70-237.000.

Dyer, Shannon L.; and Stangl, Ronald L. Decorative display assembly, kit and method of fabricating same. 4,123,862, Cl. 40-152.000.

E. R. Squibb & Sons, Inc.: *See*—
Treuner, Uwe D.; and Breuer, Hermann, 4,124,764, Cl. 544-251.000.

E-Systems, Inc.: *See*—
Martin, Willie E., 4,124,897, Cl. 364-571.000.

Eakes, James H. Dyeing system. 4,123,921, Cl. 68-22.00R.

Eastman Kodak Company: *See*—
Adin, Anthony; Huttemann, Thomas J.; and Lindholm, Robert D., 4,124,392, Cl. 96-77.000.
Ciurca, Samuel J., Jr.; and Kohrt, Carl F., 4,124,398, Cl. 96-114.100.
Kohrt, Carl F., 4,124,387, Cl. 96-29.00D.
Osborn, Harland J., 4,124,396, Cl. 96-100.00R.

Easton, Charles R.: *See*—
Mitchell, Rex C.; Friedman, Joseph; Holl, Richard J.; and Easton, Charles R., 4,124,061, Cl. 165-1.000.

Eaton, Harold G.; and Venezky, David L., to United States of America, Navy. Method of removing deposits on refrigeration system surfaces. 4,124,408, Cl. 134-3.000.

Ebauches S.A.: *See*—
Rusznyak, Andre, 4,124,806, Cl. 307-264.000.

Ebner, Peter R.; and Griffith, Louis E., to Itek Corporation. Inexpensive device for mounting circuit boards to a mother board. 4,124,878, Cl. 361-415.000.

Ecolotrol, Inc.: *See*—
Capetanopoulos, Constantine, 4,124,508, Cl. 210-194.000.

Edagawa, Setsuji: *See*—
Shibazaki, Hiroji; Edagawa, Setsuji; Hasegawa, Hisashi; and Kondo, Satoshi, 4,124,688, Cl. 423-432.000.

Eder, Emil W. Electrical heater unit. 4,124,794, Cl. 219-530.000.

Edgar, John A.: *See*—
Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., 4,124,437, Cl. 156-640.000.

Edgar, Roland: *See*—
Blue, Archie H., 4,124,463, Cl. 204-129.000.

Eicken, Karl; Theobald, Hans; Hansen, Hanspeter; Wuerzer, Bruno; and Fett, Kurt, to BASF Aktiengesellschaft. Isoxazolylmethylthiol carbamates. 4,124,591, Cl. 260-307.00H.

Einhorn, Ruediger, to Coats & Clark, Inc. Hard wall fastener. 4,124,189, Cl. 248-489.000.

Ejk, Adam J.: *See*—
Dworkin, Robert D.; and Ejk, Adam J., 4,124,618, Cl. 260-410.600.

Ek, Finn U., to Osby, Varme AB. Hot water or steam boiler. 4,123,995, Cl. 122-43.000.

Ekono Oy: *See*—
Mattern, Konrad, 4,124,438, Cl. 159-47.00R.

ELBATAINER Kunststoff- und Verpackungsgesellschaft mbH: *See*—
Garbuio, Franz, 4,124,351, Cl. 425-532.000.

Elder, George, to Schlage Lock Company. Removable core cylinder lock. 4,123,926, Cl. 70-369.000.

Electric Power Research Institute, Inc.: *See*—
Dubin, Robert R., 4,124,740, Cl. 429-104.000.

Electro Signal Lab, Inc.: *See*—
Steele, Donald F., 4,124,298, Cl. 356-338.000.

Electrorail N.V.: *See*—
Heystek, Adriaan, 4,124,299, Cl. 356-397.000.

Elger, Walter; and Petzoldt, Karl, to Schering, A.G. Novel agents and novel methods for inducing abortions. 4,124,708, Cl. 424-243.000.

Elias, James A.; and Hook, Rollin E., to Armco Steel Corporation. Columbium treated, non-aging, vacuum degassed low carbon steel and method for producing same. 4,124,412, Cl. 148-2.000.

Elkins, Robin. Audio storage and distribution system. 4,124,773, Cl. 179-2.00A.

Ellison, Charles W., Sr. Air drive assist. 4,123,910, Cl. 60-698.000.

ELT Incorporated: *See*—
Fajt, John, 4,124,846, Cl. 340-540.000.

Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, to Asta-werke Aktiengesellschaft. Process for the treatment of spasmodic conditions in humans. 4,124,716, Cl. 424-267.000.

Emmerich, Kenneth C.; and Hunter, David L., to Fansteel Inc. Block profile gauge. 4,123,848, Cl. 33-185.00R.

Emmett, John C.: *See*—
Durant, Graham J.; Emmett, John C.; Ganellin, Charon R.; and Prain, Hunter D., 4,124,717, Cl. 424-270.000.

Emmitt, Ronald W. Test tube rack. 4,124,122, Cl. 211-74.000.

Endo, Kiichi: *See*—
Onozuka, Mitsuo; Nomoto, Koki; and Endo, Kiichi, 4,124,563, Cl. 260-42.240.

Endoh, Junji: *See*—
Gotoh, Isao; Endoh, Junji; and Ueno, Tohru, 4,124,634, Cl. 562-532.000.

Energy Development Associates: *See*—
Hart, Thomas G., 4,124,741, Cl. 429-105.000.

Eng, Jeffrey D.: *See*—
Tokawa, Daniel T.; Mentz, Bernardus J.; Eng, Jeffrey D.; Cook, Edward H., Jr.; and Marks, Gerald R., 4,124,477, Cl. 204-252.000.

Engdahl, Jean; and Huguenin, Raymond, to Societe Suisse pour l'Industrie Horlogere Management Services S.A. Quartz crystal resonator. 4,124,809, Cl. 310-361.000.

Engel, Dusan J.: *See*—
Martan, Michael; and Engel, Dusan J., 4,124,643, Cl. 260-600.00R.

Engeler, William E.; and Tiemann, Jerome J., to General Electric Company. Charge transfer filter. 4,124,862, Cl. 357-24.000.

Engeler, William E.: *See*—
Baertsch, Richard D.; and Engeler, William E., 4,124,861, Cl. 357-24.000.

English Clays Lovering Pochin & Co. Limited: *See*—
Watson, James H. P., 4,124,503, Cl. 210-42.00S.

Enters, Edward W.; and Bacon, Roger J., to Gilson Brothers Company. Drive arrangement for snowblower. 4,123,857, Cl. 37-43.00E.

Episcopo, Nicholas P., to Bell Telephone Laboratories, Incorporated. DC to DC converter with regulated input impedance. 4,124,884, Cl. 363-21.000.

Erlichman, Irving, to Polaroid Corporation. Photographic camera having independent viewfinder and reflex focusing system. 4,124,858, Cl. 354-200.000.

Escher Wyss Limited: *See*—
Lehmann, Rolf, 4,124,349, Cl. 425-367.000.

Etablissement Public die: Agence Nationale de Valorisation de la Recherche: *See*—
Oswald, Roger; and Agache, Georges, 4,123,997, Cl. 123-1.00A.

Ethicon, Inc.: *See*—
Boss, Arthur E., 4,124,027, Cl. 128-339.000.

Ettinger, Donald N., to Ettinger Enterprises, Inc. Flotation device. 4,123,814, Cl. 9-337.000.

Ettinger Enterprises, Inc.: *See*—
Ettinger, Donald N., 4,123,814, Cl. 9-337.000.

Eustace, Daniel J.: *See*—
Shropshire, Joseph A.; and Eustace, Daniel J., 4,124,693, Cl. 423-503.000.

Excel Industries, Inc.: *See*—
Spretnjak, Steve A., 4,124,054, Cl. 160-90.000.

Exxon Research & Engineering Co.: *See*—
Horner, Ian M., 4,123,837, Cl. 29-157.30R.
Horowitz, Harold S.; Longo, John M.; and Haberman, Joel I., 4,124,539, Cl. 252-518.000.
Kim, Chang J.; and Farcasiu, Dan, 4,124,692, Cl. 423-492.000.
McVicker, Gary B., 4,124,647, Cl. 568-671.000.
Murer, Angelo; and Amadei, Ottavio, 4,124,747, Cl. 429-210.000.
Olavesen, Christopher; Sankey, Bruce M.; and Gilbert, John B., 4,124,650, Cl. 260-676.00R.
Reid, Lloyd E., 4,124,489, Cl. 208-87.000.
Shropshire, Joseph A.; and Eustace, Daniel J., 4,124,693, Cl. 423-503.000.

Ezure, Toshikazu, to Nissan Motor Company, Ltd. Fork lift truck driven by internal combustion engine. 4,124,095, Cl. 187-9.00R.

F.B. Mercer Limited: *See*—
Mercer, Frank B., 4,124,350, Cl. 425-393.000.

Fabre, Jean-Louis; Farge, Daniel; and James, Claude, to Rhone-Poulenc Industries. Thienothienylcarbonyl-phenylalkanoic acids and derivatives thereof. 4,124,596, Cl. 260-332.20A.

Fabricated Services, Inc.: *See*—
Lay, Joe B., 4,124,511, Cl. 210-447.000.

Fagan, John L.: *See*—
Smith, Philip C.; and Fagan, John L., 4,124,900, Cl. 365-72.000.

Fahey, Darryl R., to Phillips Petroleum Company. Trans-fluoro(pentafluorophenyl)-bis(triethylphosphine)nickel(II). 4,124,627, Cl. 260-439.00R.

Fajt, John, to ELT Incorporated. Method and apparatus for providing output indications in response to the presence of an electromagnetic energy receptor. 4,124,846, Cl. 340-540.000.

Fancher, Alex, Jr.: *See*—
Brumley, Charles D.; Fancher, Alex, Jr.; and Lee, Paul L., 4,124,663, Cl. 264-3.00D.

Fansteel Inc.: *See*—
Cecka, Andrew M.; and Pawling, Paul G., 4,124,670, Cl. 264-45.300.
Emmerich, Kenneth C.; and Hunter, David L., 4,123,848, Cl. 33-185.00R.

Farcasiu, Dan: *See*—
Kim, Chang J.; and Farcasiu, Dan, 4,124,692, Cl. 423-492.000.

Farge, Daniel: *See*—
Fabre, Jean-Louis; Farge, Daniel; and James, Claude, 4,124,596, Cl. 260-332.20A.

Farrington, Diane G.; and Meloy, Gilbert K., to Standard Oil Company. Process for making amphora aggregates. 4,124,535, Cl. 252-448.000.

Fattaleh, John B., to Porta-Pro Incorporated. Self contained power actuated dental appliance. 4,123,845, Cl. 32-59.000.

Fawn Engineering Corporation: *See*—
Albright, Henry J., 4,124,142, Cl. 221-75.000.

Federal, Inc.: *See*—
Nemec, Joseph F., Jr., 4,123,925, Cl. 70-329.000.

Fehlhaber, Gustav James, to NPI Corporation. Refrigeration feed system. 4,123,919, Cl. 62-503.000.

Feldmuhle Aktiengesellschaft: *See*—
Dessauer, Guido, 4,124,439, Cl. 162-146.000.

Fellowes Manufacturing Company: *See*—
Klaus, Gerald R., 4,124,261, Cl. 312-183.000.
Felt Products Mfg. Co.: *See*—
Neff, Clarence H., 4,123,815, Cl. 14-16.100.
Feltgen, Karlheinz: *See*—
Pieper, Christian; Feltgen, Karlheinz; and Nogaj, Alfred, 4,124,673, Cl. 264-171.000.
Pieper, Christian; Uhlemann, Hans; Feltgen, Karlheinz; Nickel, Klaus; Nogaj, Alfred; and Lorenz, Gunter, 4,124,674, Cl. 264-233.000.
Ferm, Donald J.: *See*—
Schwalley, Lawrence L.; and Ferm, Donald J., 4,124,520, Cl. 252-106.000.
Ferrentino, Antonio, to Industrie Pirelli Societa per Azioni. Helix winding apparatus. 4,123,928, Cl. 72-66.000.
Feschenko, Ninel G.: *See*—
Yagupolsky, Lev M.; Zavatsky, Vladimir N.; Semeny, Valery Y.; Bildinov, Konstantin N.; Serebrov, Petr V.; Goncharenko, Alevtina A.; Kirsanov, Alexandr V.; Lyapunov, Mikhail I.; and Feschenko, Ninel G., 4,124,456, Cl. 204-59.00R.
Fett, Kurt: *See*—
Eicken, Karl; Theobald, Hans; Hansen, Hanspeter; Wuerzer, Bruno; and Fett, Kurt, 4,124,591, Cl. 260-307.00H.
FIAT Societa per Azioni: *See*—
Bertone, Antonino; and Rivetti, Enrico, 4,123,908, Cl. 60-548.000.
Fiedler, David F., to Dana Corporation. Piston pin bore and method of finishing. 4,124,010, Cl. 123-193.00P.
Field, Arthur K.: *See*—
Lampson, George P.; Tytell, Alfred A.; Field, Arthur K.; and Hilleman, Maurice R., 4,124,702, Cl. 424-85.000.
Findley, John E.: *See*—
Yen, Teh F.; and Findley, John E., 4,124,501, Cl. 210-16.000.
Finigan, Arthur; and Webb, Michael G., to British Petroleum Company Limited, The. Oil control system. 4,123,911, Cl. 405-68.000.
Finite Filter Co., Inc.: *See*—
Berger, L. Joseph, Jr.; and Guequierre, Denis D., 4,124,360, Cl. 55-187.000.
Fioravazzi, Franco, to Demag, A.G. Truck for transfer tanks in metal plants, particularly for steel strand casting plants. 4,124,152, Cl. 222-604.000.
Firmenich, S.A.: *See*—
Buchi, George H.; and Hauser, Arnold, 4,124,642, Cl. 260-586.00G.
First Wisconsin Trust Company: *See*—
Leitner, Gordon F.; Wiegratz, Fred G.; Cleaver, John C., deceased; Cleaver, Laird C., personal representative; and First Wisconsin Trust Company, 4,124,065, Cl. 165-95.000.
Fischer, Charles F., to Colgate-Palmolive Company. Apparatus for producing variegated soap. 4,124,348, Cl. 425-297.000.
Fischer, Ernst, to Mobius & Ruppert KG. Lead sharpener. 4,124,048, Cl. 144-28.200.
Fischer, Johann P.; Cavagna, Friedrich; Duch, Eduard; and Muck, Karl-Friedrich, to Hoechst Aktiengesellschaft. Process for preparing acrylic acid or methacrylic acid ester polymer having a high isotacticity and a narrow molecular weight distribution. 4,124,751, Cl. 526-82.000.
Fischer, Johanna: *See*—
Mixich, Georg; Thiele, Kurt; and Fischer, Johanna, 4,124,767, Cl. 548-341.000.
Fischer & Porter Company: *See*—
Herzl, Peter J.; and Shaffer, Robert G., 4,123,940, Cl. 73-194.0VS.
Fischer, Wolfgang: *See*—
Knorre, Helmut; Langer, Manfred; and Fischer, Wolfgang, 4,124,406, Cl. 106-111.000.
Fitton, Peter; and Moffet, Harold, to Hoffmann-La Roche Inc. Preparation of esters of hydroxy tiglic aldehyde. 4,124,619, Cl. 260-410.600.
Fives-Cail Babcock: *See*—
Roggo, Bernard, 4,124,059, Cl. 164-436.000.
Flanigen, Edith M.: *See*—
Grose, Robert W.; and Flanigen, Edith M., 4,124,686, Cl. 423 328.000.
Fleet Engineers, Inc.: *See*—
Juergens, Alfred R., 4,124,184, Cl. 248-66.000.
Fleischmann, Lewis; Meyer, Glenn A.; and Hittman, Fred, to Hittman Corporation. Non-invasive nuclear device for communicating pressure inside a body to the exterior thereof. 4,124,023, Cl. 128-2.00A.
Fleischmann, Martin; Goodridge, Francis; and King, Christopher J. H., to National Research Development Corporation. Electrochemical processes. 4,124,453, Cl. 204-1.00R.
Flint, John R.: *See*—
Axelrod, Donald J.; and Flint, John R., 4,124,290, Cl. 355-41.000.
Flora, John H.; and Akgerman, Nuri, to United States of America, Army. Eddy current probe subsystem. 4,124,792, Cl. 219-124.340.
Flow Industries, Inc.: *See*—
Geller, Edward W., 4,124,359, Cl. 55-130.000.
FMC Corporation: *See*—
Blumbergs, John H.; and Scholer, Fred R., 4,124,356, Cl. 8-111.000.
Derner, William J.; and Spalding, Ronald P., 4,124,257, Cl. 308-194.000.
Hafner, Eugene R., 4,124,258, Cl. 308-236.000.
Hobbs, Millice F.; and Green, Arthur C., 4,124,499, Cl. 210-28.000.
Samuel, Alan J.; Loss, Alan M.; and Cremer, Hans H., 4,124,001, Cl. 123-41.120.
Fogelberg, Mark J., to Borg-Warner Corporation. Automatic four-wheel drive transfer case. 4,124,085, Cl. 180-49.000.
Ford Motor Company: *See*—
Janotik, Adam M., 4,124,086, Cl. 180-65.00R.
Kreger, Thomas C., 4,123,916, Cl. 62-243.000.
Roddy, Patrick; Downes, George W.; Searle, John V.; and Bregazzi, Terence W., 4,123,943, Cl. 73-623.000.
Rodenkirch, Norman E., 4,124,006, Cl. 123-119.00A.
Foreman, Gordon T.; Gallaro, Anthony V.; and Williams, George N., to GTE Sylvania Incorporated. Resistive electrical conductive coating for use in a cathode ray tube. 4,124,540, Cl. 252-518.000.
Foresight Industries: *See*—
Deike, Robert F., 4,124,081, Cl. 173-28.000.
Forrest, Norman. Process of making synthetic suede. 4,124,428, Cl. 156-243.000.
Forrester, Alvin T.: *See*—
Cook, Leslie J.; Forrester, Alvin T.; Mahoney, John F.; Perel, Julius; and Vickers, Kenneth E., 4,124,801, Cl. 250-288.000.
Fort, Jean-Paul: *See*—
Michel, Max; and Fort, Jean-Paul, 4,124,699, Cl. 423-628.000.
Foulkes, Stanley Charles, to Chloride Group Limited. Manufacture of battery plates. 4,124,042, Cl. 141-1.100.
Four Star Corporation: *See*—
Kowalski, Gerald L., 4,124,155, Cl. 224-42.10D.
Frame, Robert R., to UOP Inc. Catalytic oxidation of mercaptan in petroleum distillate including alkaline reagent and substituted ammonium halide. 4,124,493, Cl. 208-206.000.
Frame, Robert R., to UOP Inc. Treating a petroleum distillate with a supported metal phthalocyanine and an alkanolamine hydroxide. 4,124,494, Cl. 208-207.000.
Frame, Robert R., to UOP Inc. Catalytic composite for the treatment of sour petroleum distillates. 4,124,531, Cl. 252-428.000.
Frangos Brothers & Co. Ltd.: *See*—
Kinrade, Stephen S., 4,123,991, Cl. 119-10.000.
Franzmann, Rainer. Device for the manual playing of electronic musical instruments. 4,123,960, Cl. 84-1.170.
Frazier, Richard V., Jr.; and Levenson, Tony, to Bendix Corporation, The. Video processor for distance measuring equipment. 4,124,850, Cl. 343-7.300.
Freedy, Allan L.: *See*—
Bianchetta, Donald L.; Freedy, Allan L.; and Rhodes, Sammy J., 4,123,907, Cl. 60-445.000.
Freeman, Richard B. Composite picture frame. 4,124,323, Cl. 403-402.000.
Freeport Minerals Company: *See*—
Latiolais, Rene L.; and Hranitzky, Walter W., 4,124,253, Cl. 299-6.000.
Freese, Donald R.: *See*—
Johnson, Gary D.; Levie, Michael M.; Freese, Donald R.; Lee, Robert W.; and Paufve, Eldred H., 4,124,887, Cl. 364-107.000.
French, Charles T., to Combustion Engineering, Inc. Turbine trip system. 4,123,909, Cl. 60-646.000.
French Oil Mill Machinery Company, The: *See*—
Bredeson, Dean K.; Craig, Gregory C.; Gilius, William J.; and Johnson, Charles R., 4,124,306, Cl. 366-75.000.
Frentress, Zane, to Milliken Research Corporation. Mend counter. 4,123,985, Cl. 112-266.000.
Fried. Krupp GmbH: *See*—
Anisic, Ladislav, 4,124,307, Cl. 366-76.000.
Friedman, Joseph: *See*—
Mitchell, Rex C.; Friedman, Joseph; Holl, Richard J.; and Easton, Charles R., 4,124,061, Cl. 165-1.000.
Friedrich Kocks GmbH & Co.: *See*—
Brauer, Hans, 4,123,927, Cl. 72-16.000.
Friend, Manuel N.: *See*—
Schwebel, Paul R.; and Friend, Manuel N., 4,124,024, Cl. 128-173.00H.
Frohn, Walter, to Bell Maschinenfabrik AG. Process for the removal and after treatment of blown hollow bodies of plastic. 4,124,668, Cl. 264-40.100.
Fry, John S., to Union Carbide Corporation. Post-formed aqueous phenolic resin dispersions. 4,124,554, Cl. 260-29.300.
Fuchs, Otto: *See*—
Kirsch, Aloys, Fuchs, Otto; and Spietschka, Ernst, 4,124,768, Cl. 560-19.000.
Fuhrer, Jack S.; and Keizer, Eugene O., to RCA Corporation. Narrowed-electrode pickup stylus for video disc systems. 4,124,867, Cl. 358-128.000.
Fuji Photo Film Co., Ltd.: *See*—
Imai, Shinichi; and Sakanoue, Seiki, 4,124,393, Cl. 96-77.000.
Ochiai, Takeji; and Nakao, Sho, 4,124,395, Cl. 96-87.00R.
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Kawamura, Atsushi; and Fukushima, Yoshio, 4,124,882, Cl. 362-300.000.

Fuller, Harold L., Jr. Fuel saving apparatus and spark plug therefor. 4,124,012, Cl. 123-198.00F.

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Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, 4,124,296, Cl. 355-75.000.

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Dix, Kurt; and Hoffmann, Werner, 4,124,451, Cl. 202-248.000.

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Gillbrand, Per S.; and Gadefelt, Bengt G., 4,123,996, Cl. 123-1.00R.

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Gallo, John A., to Ideal Instruments, Inc. Electroejaculation device. 4,124,028, Cl. 128-407.000.

Galzin, Sylvie: *See*—
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Ganellin, Charon R.: *See*—
Durant, Graham J.; Emmett, John C.; Ganellin, Charon R.; and Prain, Hunter D., 4,124,717, Cl. 424-270.000.

Gann, Ronald A., to International Telephone and Telegraph Corporation. Recycling pilot ignition system. 4,124,354, Cl. 431-46.000.

Garbuio, Franz, to ELBATAINER Kunsstoff- und Verpackungsgesellschaft mbH. Apparatus for the production of blowmolded synthetic-resin bodies. 4,124,351, Cl. 425-532.000.

Gardiner, Kenneth W., to Savin Business Machines Corporation. Background brightness control for document copier. 4,124,295, Cl. 355-68.000.

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Batts, John H.; and Garrison, Judd F., 4,123,864, Cl. 40-322.000.

Garver, Curtis M. Method of and apparatus for cutting a tunnel in plastic soil. 4,124,082, Cl. 175-62.000.

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Gateway Industries, Inc.: *See*—
Cislak, Raymond S., 4,124,175, Cl. 242-107.700.

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King, David W.; and Pipes, Robert K., 4,124,070, Cl. 166-255.000.

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Hofmann, Dionys, 4,124,191, Cl. 254-89.00R.

Geen, Henry C.; Vinton, Clarence S.; and Torbet, Christopher J., to Chemotronics International, Inc. Method for the preparation of reticulate carbon structures. 4,124,691, Cl. 423-449.000.

Geller, Edward W., to Flow Industries, Inc. Electrostatic precipitator. 4,124,359, Cl. 55-130.000.

Gembicki, Stanley A.; and Morgan, Charles L., to UOP Inc. Coextruded catalytic composite. 4,124,537, Cl. 252-465.000.

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Shores, Marvin W., 4,124,796, Cl. 235-88.00R.

General Electric Company: *See*—
Abolins, Visvaldis; and Lee, Gim F., Jr., 4,124,654, Cl. 260-876.00B.
Baertsch, Richard D.; and Engeler, William E., 4,124,861, Cl. 357-24.000.
Dunn, Bruce S., 4,124,744, Cl. 429-193.000.
Engeler, William E.; and Tiemann, Jerome J., 4,124,862, Cl. 357-24.000.
Greskovich, Charles D.; and O'Clair, Chester R., 4,124,402, Cl. 106-73.500.
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Heffelfinger, Richard H., 4,124,019, Cl. 126-271.000.
Lee, Minyoung; Szala, Lawrence E.; and DeVries, Robert C., 4,124,401, Cl. 106-44.000.
Phipps, Donald L., Jr.; and Wambach, Allen D., 4,124,561, Cl. 260-40.00R.
Pohl, Walter J., 4,124,125, Cl. 214-1.0BB.
Quinn, Clayton B.; and Rock, John A., 4,124,652, Cl. 260-860.000.
Schultz, Frederick E., 4,123,832, Cl. 28-143.000.
Strong, Herbert M.; Chrenko, Richard M.; and Tuft, Roy E., 4,124,690, Cl. 423-446.000.
Webb, William M., 4,124,187, Cl. 248-188.300.

General Motors Corporation: *See*—
Dudynskyj, Peter P.; Kline, Daniel L.; and Hogan, James T., 4,124,096, Cl. 187-9.00R.
Dudynskyj, Peter P., 4,124,098, Cl. 187-9.00R.
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Genslak, Stanley L., 4,124,000, Cl. 123-32.0ST.
Hawks, Dale A.; Kline, Daniel L.; and Hogan, James T., 4,124,097, Cl. 187-9.00R.
Hawks, Dale A., 4,124,100, Cl. 187-9.00R.
Sagady, Daniel V., 4,124,318, Cl. 403-14.000.

Genevase, Frank O. Brocade tool. 4,123,973, Cl. 101-379.000.

Genslak, Stanley L., to General Motors Corporation. Mixed cycle stratified charge engine with ignition antechamber. 4,124,000, Cl. 123-32.0ST.

Gentile, Camillo: *See*—
Bialski, Alexander; Gentile, Camillo; and Sepall, Ola, 4,124,168, Cl. 241-14.000.

Georgiev, Atanas G.; and Daskalov, Hristo P., to DSO "Pharmachim". 5-Substituted derivatives of 5H-dibenz (b,f)-azepine and method for obtaining the same. 4,124,583, Cl. 260-239.00D.

Georgoudis, Paul C., to National Starch and Chemical Corporation. Thermoplastic copolyesters prepared from aromatic dicarboxylic acid substituted succinic acid or anhydride and a glycol and the use thereof in adhesives. 4,124,571, Cl. 260-16.000.

Gerhardt, Hans J.: *See*—
Kramer, Carl; and Gerhardt, Hans J., 4,123,805, Cl. 3-1.500.

Gersch, Karl H.; and Losel, Georg, to Balcke-Durr Aktiengesellschaft. Apparatus for suspension of a tube wall. 4,123,994, Cl. 122-6.00A.

Giannini, Umberto; Albizzati, Enrico; Parodi, Sandro; and Pirinoli, Franco, to Montedison S.p.A. Catalysts for polymerizing olefins. 4,124,532, Cl. 252-429.00B.

Gibbs, Gary A.: *See*—
Black, Stephen R.; and Gibbs, Gary A., 4,124,844, Cl. 340-347.0AD.

Gibson-Homans Company, The: *See*—
Slywka, Michael, 4,124,045, Cl. 141-129.000.

Gilbert, John B.: *See*—
Olavesen, Christopher; Sankey, Bruce M.; and Gilbert, John B., 4,124,650, Cl. 260-676.00R.

Giles, Michael B.: *See*—
Dutta, Anand S.; and Giles, Michael B., 4,124,703, Cl. 424-177.000.

Gilius, William J.: *See*—
Bredeson, Dean K.; Craig, Gregory C.; Gilius, William J.; and Johnson, Charles R., 4,124,306, Cl. 366-75.000.

Gillan, John; and Lubbock, Frederick J., to Dulux Australia Ltd. Mar-resistant paints. 4,124,548, Cl. 260-17.00R.

Gillbrand, Per S.; and Gadefelt, Bengt G., to Saab-Scania Aktiebolag. Internal combustion engines. 4,123,996, Cl. 123-1.00R.

Gilson Brothers Company: *See*—
Enters, Edward W.; and Bacon, Roger J., 4,123,857, Cl. 37-43.00E.

Giorgi, Tiziano A.: *See*—
della Porta, Paolo; Giorgi, Tiziano A.; and Rosai, Livio, 4,124,659, Cl. 264-0.500.

Giroux, Eugene L.; Prakash, Nellikunja J.; and Schechter, Paul J., to Merrell Toraude et Compagnie. Enhancing zinc serum and tissue levels. 4,124,718, Cl. 424-274.000.

Gladden, James B. Pneumatic bulk material removal apparatus and method. 4,124,409, Cl. 134-21.000.

Gladwin, Floyd R. Side wall guide for adjustable width continuous casting mold. 4,124,058, Cl. 164-436.000.

Glaser, Rudolf: *See*—
Koehnlein, Ernst; Glaser, Rudolf; and Koessler, Ludwig, 4,124,655, Cl. 260-878.00R.

Glory Kogyo Kabushiki Kaisha: *See*—
Asami, Kazuto, 4,123,892, Cl. 53-54.000.

God, Andrew, Jr. Safety traffic barrier. 4,124,197, Cl. 256-13.100.

Goings, Harford E. Spray guard for vehicles. 4,124,221, Cl. 280-154.50R.

Goldstein, Gideon, to Sloan Kettering Institute for Cancer Research. Immunoassay for thymopoietin. 4,124,700, Cl. 424-1.000.

Gomes, Gilbert S.: *See*—
Otrhalek, Joseph V.; Ajluni, Raymond M.; and Gomes, Gilbert S., 4,124,414, Cl. 148-6.15R.

Goncharenko, Alevtina A.: *See*—
Yagupolsky, Lev M.; Zavatsky, Vladimir N.; Semeny, Valery Y.; Bildinov, Konstantin N.; Serebrov, Petr V.; Goncharenko, Alevtina A.; Kirsanov, Alexandr V.; Lyapunov, Mikhail I.; and Feschenko, Ninel G., 4,124,456, Cl. 204-59.00R.

Goodridge, Francis: *See*—
Fleischmann, Martin; Goodridge, Francis; and King, Christopher J. H., 4,124,453, Cl. 204-1.00R.

Goodyear Tire & Rubber Company, The: *See*—
DeWitt, Marion A., 4,124,679, Cl. 264-326.000.
Greenwood, Alan; and Doss, Tim W., 4,124,346, Cl. 425-188.000.
Gross, Bill B.; and Maximovich, Michael J., 4,124,555, Cl. 260-29.6HN.
Kuczkowski, Joseph A., 4,124,565, Cl. 260-45.9QB.
Makinson, Charles L.; Sutter, Kenneth C.; and Tyson, David Z., 4,124,343, Cl. 425-145.000.
O'Mahoney, Joseph F., Jr., 4,124,750, Cl. 526-20.000.
Rubio, Diego C., Jr.; Bauer, Richard G.; and Scriver, Richard M., Jr., 4,124,546, Cl. 260-5.000.
Rye, Grover W.; and Bell, Richard L., 4,124,425, Cl. 156-168.000.
Scheibelhoffer, Anthony S.; and Meier, Richard E., 4,124,570, Cl. 528-273.000.

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Serenkov, Vasily I.; Deev, Jury S.; Ryabov, Evgeny A.; Gorbunova, Elena V.; Tikhomirov, Vladimir S.; Dobrokhotova, Marina K.; and Berezovsky, Alexandr V., 4,124,468, Cl. 204-159.110.

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Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.

Gotoh, Isao; Endoh, Junji; and Ueno, Tohru, to Asahi Glass Company, Ltd. Process for producing methacrylic acid from isobutylene by two step oxidation. 4,124,634, Cl. 562-532.000.

Gould Inc.: *See*—
Panaro, Robert J., 4,124,837, Cl. 337-251.000.
Wilks, Howard G., 4,124,836, Cl. 337-186.000.

Grahl, Darwin R.; and Haramoto, Cary, to Parker-Hannifin Corporation. Tube coupling. 4,124,235, Cl. 285-340.000.

GRAPHA-Holding AG.: *See*—
Muller, Hans, 4,124,203, Cl. 270-55.000.

Grawe, Helmut: *See*—
Mutsch, Adam; Petters, Claus; and Grawe, Helmut, 4,123,974, Cl. 102-13.000.

Grawey, Charles E., to Caterpillar Tractor Co. Two piece inner tube. 4,124,053, Cl. 152-349.000.

Gray, W. Robert, Jr.: *See*—
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Gray, W. Robert, Jr., 4,124,367, Cl. 65-104.000.

Greber, Gerd: *See*—
Lohmann, Dieter; Furrer, Peter; Darms, Roland; and Greber, Gerd, 4,124,651, Cl. 260-857.0PA.

Green, Arthur C.: *See*—
Hobbs, Millice F.; and Green, Arthur C., 4,124,499, Cl. 210-28.000.

Green, George E.; Stark, Bernard P.; and Waterhouse, John S., to Ciba-Geigy Corporation. Photopolymerizable diepoxides containing a nitrogen heterocycle. 4,124,760, Cl. 542-432.000.

Green, Michael J.; and Shue, Ho-Jane, to Schering Corporation. 7α-Halogeno-3,20-dioxo-1,4-pregnadienes, methods for their manufacture, their use as anti-inflammatory agents, and pharmaceutical formulations useful therefor. 4,124,707, Cl. 424-241.000.

Green, William F., to Transco Products, Inc. Fiber optic switch and connector. 4,124,271, Cl. 350-96.200.

Greenberg, Leon S., to RCA Corporation. Plastic encapsulated semiconductor devices. 4,124,864, Cl. 357-70.000.

Greenhalgh, Colin W.; Newton, David F.; Budziarek, Richard; and Clarke, Howard, to Imperial Chemical Industries Limited. Transfer dyeing with 1-amino-4-anilinoanthraquinone dyes. 4,124,355, Cl. 8-2.50A.

Greenwood, Alan; and Doss, Tim W., to Goodyear Tire & Rubber Company, The. Extruder die arrangement. 4,124,346, Cl. 425-188.000.

Greenwood Mills, Inc.: *See*—
Mead, Donald C.; Kasdan, Harvey L.; and Dorrity, Jordan L., 4,124,300, Cl. 356-429.000.

Greeson, Maurice M.: *See*—
Haber, Terry M.; and Greeson, Maurice M., 4,124,881, Cl. 362-253.000.

Grell, Helmut K.: *See*—
Berner, Karl; Koltermann, Jurgen K. D.; and Grell, Helmut K., 4,124,026, Cl. 128-303.00R.

Greskovich, Charles D.; and O'Clair, Chester R., to General Electric Company. Hot pressing of silicon nitride using magnesium silicide. 4,124,402, Cl. 106-73.500.

Greskovich, Charles D.; Prochazka, Svante; and O'Clair, Chester R., to General Electric Company. Hot pressing of silicon nitride using beryllium additive. 4,124,403, Cl. 106-73.500.

Grier, William R.: *See*—
Gubelmann, William S., deceased; Gubelmann, Walter S., executor; and Grier, William R., 4,124,314, Cl. 400-663.000.

Griffith, Louis E.: *See*—
Ebner, Peter R.; and Griffith, Louis E., 4,124,878, Cl. 361-415.000.

Grinberg, Jan; and Marom, Emanuel, to Hughes Aircraft Company. Optical subtraction of images in real time. 4,124,278, Cl. 350-342.000.

Grose, Robert W.; and Flanigen, Edith M., to Union Carbide Corporation. Crystalline zeolite phi. 4,124,686, Cl. 423-328.000.

Gross, Bill B.; and Maximovich, Michael J., to Goodyear Tire & Rubber Company, The. Water reducible coating compositions containing copolymers of vinyl pyrrolidone and unsaturated carboxylic acid and containing a solvent and a volatile amine. 4,124,555, Cl. 260-29.6HN.

Gross, Heiko, to Siempelkamp Giesserei KG. Pressure vessel for nuclear reactor. 4,124,447, Cl. 176-87.000.

Gross, Jerome A.: *See*—
Barta, Kent S.; and Gross, Jerome A., 4,124,449, Cl. 195-139.000.

Gross, Sam. Heart novelty and relaxation device. 4,124,022, Cl. 128-1.00C.

Gruner, Hans; Schrewe, Hans; Keuper, Erich; and Pleschhutschnigg, Fritz-Peter, to Mannesmann Aktiengesellschaft. Casting powder. 4,124,515, Cl. 252-62.000.

Grunert, Hartmut: *See*—
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,124,597, Cl. 260-343.600.

Grunner, Erich; and Schaller, Ewald, to Lim-Holding S.A. Apparatus for casting or injection-molding car tires. 4,124,345, Cl. 425-183.000.

Gschwend, Heinz W.; and Hillman, Malvin J., to Ciba-Geigy Corporation. Aromatic dicarboximides. 4,124,593, Cl. 260-326.00N.

GTE Sylvania Incorporated: *See*—
Foreman, Gordon T.; Gallaro, Anthony V.; and Williams, George N., 4,124,540, Cl. 252-518.000.
Neuber, Ralph E.; and Rehkopf, Charles H., 4,124,263, Cl. 316-1.000.

Guarrera, Anthony T. Bathtub with spray outlet converted to rectogenital cleansing device. 4,123,808, Cl. 4-7.000.

Gubelmann, Walter S., executor: *See*—
Gubelmann, William S., deceased; Gubelmann, Walter S., executor; and Grier, William R., 4,124,314, Cl. 400-663.000.

Gubelmann, William S., deceased; by Gubelmann, Walter S., executor; and Grier, William R., to R & I Patent Corporation. Justifying text writing composing machine. 4,124,314, Cl. 400-663.000.

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Berger, L. Joseph, Jr.; and Guequierre, Denis D., 4,124,360, Cl. 55-187.000.

Guidry, Kirby J. Coupling for helically corrugated spiral pipe. 4,124,236, Cl. 285-373.000.

Guildford, Allen J.: *See*—
McLoughlin, Bernard J.; and Guildford, Allen J., 4,124,709, Cl. 424-248.400.

Guise, Geoffrey B., to Commonwealth Scientific and Industrial Research Organization. Method for the preparation of a composition containing polycarbamoyl sulphonates from polyisocyanates. 4,124,553, Cl. 260-29.2TN.

Gulf Research & Development Company: *See*—
Carr, Norman L.; and McGinnis, Edgar L., 4,124,485, Cl. 208-8.000.

Gulla, Michael; and Savas, Christy, to Shipley Company Inc. Stabilized electroless plating solutions. 4,124,399, Cl. 106-1.230.

Gunter, Dieter, to Hoechst Aktiengesellschaft. Benzimidazo-[1,2-a]-quinolines. 4,124,589, Cl. 546-70.000.

Gutman, Arnold D., to Stauffer Chemical Company. Certain cyanodithioimidocarbonates. 4,124,637, Cl. 260-551.00C.

Haber, Terry M.; and Greeson, Maurice M. Dice with illuminating means. 4,124,881, Cl. 362-253.000.

Haberman, Joel I.: *See*—
Horowitz, Harold S.; Longo, John M.; and Haberman, Joel I., 4,124,539, Cl. 252-518.000.

Hafner, Eugene R., to FMC Corporation. Bearing ring fastening assembly. 4,124,258, Cl. 308-236.000.

Haigh Engineering Company Limited, The: *See*—
Preece, Graham M., 4,124,789, Cl. 200-81.00R.

Hailey, Laurence N.: *See*—
Coppola, John A.; Hailey, Laurence N.; and McMurtry, Carl H., 4,124,667, Cl. 264-29.500.

Halbach & Braun: *See*—
Braun, Ernst; and Braun, Gert, 4,124,170, Cl. 241-265.000.

Hall, John B.: *See*—
Sprecker, Mark A.; Kryschuk, John J.; and Hall, John B., 4,124,644, Cl. 260-602.000.

Hamada, Hiroshi: *See*—
Yano, Kozo; Inami, Yasuhiko; Hamada, Hiroshi; and Uede, Hisashi, 4,123,841, Cl. 29-570.000.

Hamazaki, Yasuhiko; Kawabata, Shozo; Yamamoto, Toshiyuki; Shiraishi, Yasuo; Ueno, Akira; Amemiya, Koji; and Saga, Katsumas, to Kaken Chemical Co., Ltd. Anti-inflammatory agent of benzoyl derivative. 4,124,726, Cl. 424-331.000.

Hamilton, Douglas J., to University Patents, Inc. Device for measuring thermal parameters. 4,123,938, Cl. 73-190.00H.

Hamilton, Robert. Curtain suspension and drawing system, and rail therefor. 4,123,820, Cl. 16-95.00D.

Hammerstrom, Knut: *See*—
Horak, Otto; Alles, Hans-Ulrich; Horstmann, Walter; Hammerstrom, Knut; and Potthast, Ruthard, 4,124,505, Cl. 210-63.00R.

Hanai, Sosuke: *See*—
Sera, Hidefumi; Tsubota, Motohiko; and Hanai, Sosuke, 4,124,394, Cl. 96-77.000.

Hansen, Dale J.: *See*—
Bollinger, Frederic G.; D'Amico, John J.; and Hansen, Dale J., 4,124,375, Cl. 71-96.000.

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Eicken, Karl; Theobald, Hans; Hansen, Hanspeter; Wuerzer, Bruno; and Fett, Kurt, 4,124,591, Cl. 260-307.00H.

Hansen, Jens, to Blaupunkt-Werke GmbH. Disturbing signal detection circuit. 4,124,819, Cl. 325-479.000.

Hansen, John N. Solubilizable polyacrylamide gels containing disulfide cross-linkages. 4,124,638, Cl. 260-561.00S.

Hansford, Rowland C., to Union Oil Company of California. Thermally stable coprecipitated catalysts useful for methanation and other reactions. 4,124,629, Cl. 260-449.60M.

Harada, Toshiro: *See*—
Nonoyama, Takao; Harada, Toshiro; and Suzuki, Yukio, 4,123,904, Cl. 60-290.000.

Haramoto, Cary: *See*—
Grahl, Darwin R.; and Haramoto, Cary, 4,124,235, Cl. 285-340.000.

Hardtmann, Goetz E., to Sandoz, Inc. 4-Hydroxy-3-sulfinyl-quinolin-2(1H)-ones. 4,124,587, Cl. 546-90.000.

Hardtmann, Goetz E.; and Coppola, Gary M., to Sandoz, Inc. 4-Hydroxy-quinolin-2-one-3-phosphonic acid esters. 4,124,588, Cl. 546-21.000.

Harnischfeger Corporation: *See*—
Phillips, Frank T., 4,124,226, Cl. 280-765.000.

Harnsberger, Bobby G.: *See*—
Allen, Joseph C.; and Harnsberger, Bobby G., 4,124,074, Cl. 166-278.000.

Harper, Robert W.: *See*—
Durgan, Virgil R. C.; Harper, Robert W.; and Ritter, Arthur J., Jr., 4,123,906, Cl. 60-403.000.
Harris, Betty J. Toilet paper holder. 4,124,259, Cl. 312-39.000.
Harris Corporation: *See*—
Mason, Donald R., 4,124,863, Cl. 357-54.000.
Harshbarger, Roland N.: *See*—
Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., 4,124,437, Cl. 156-640.000.
Hart, Cullen P., to Caterpillar Tractor Co. Vehicle braking system. 4,124,254, Cl. 303-2.000.
Hart, Thomas G., to Energy Development Associates. Hydrogen/chlorine electrochemical energy storage system. 4,124,741, Cl. 429-105.000.
Hart, Wallace F.: *See*—
Reed, Robert D.; Hart, Wallace F.; and Cegielski, John M., 4,124,681, Cl. 423-210.000.
Hartery, William J. Wiper blade and system. 4,123,817, Cl. 15-250.040.
Harvey, David L., to Arco Industries Corporation. Self-adjusting punch device. 4,123,956, Cl. 83-620.000.
Hasegawa, Hisashi: *See*—
Shibazaki, Hiroji; Edagawa, Setsuji; Hasegawa, Hisashi; and Kondo, Satoshi, 4,124,688, Cl. 423-432.000.
Hashiudo, Keinichi; and Imanishi, Kanji, to Aicello Chemical Co., Ltd. Corrosion-inhibiting plastic films. 4,124,549, Cl. 260-18.00N.
Hatakeyama, Susumu, to Tokico Ltd. Gas spring. 4,124,202, Cl. 267-118.000.
Hatanaka, Takefumi. Document shredder. 4,124,169, Cl. 241-101.400.
Hatta, Masakazu: *See*—
Kawamura, Masao; Hatta, Masakazu; Koune, Nobuhiro; and Kitagishi, Nobuyuki, 4,124,646, Cl. 260-609.00E.
Hattori, Hiroyuki: *See*—
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Hauser, Arnold: *See*—
Buchi, George H.; and Hauser, Arnold, 4,124,642, Cl. 260-586.00G.
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Hayami, Hiroshi; and Shimizu, Hitoshi, to Nippon Kayaku Kabushiki Kaisha. Process for the production of aromatic nitriles. 4,124,631, Cl. 260-465.00C.
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Hayashi, Yoshimasa, to Nissan Motor Company, Ltd. Deceleration control system. 4,123,903, Cl. 60-277.000.
Hayashi, Yukichi, to Nippon Coinco Co. Ltd. Coin inspecting apparatus. 4,124,111, Cl. 194-102.000.
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Hearst, John E.; Rapoport, Henry; Isaacs, Stephen; and Shen, Che-Kun J., to Hoffmann-La Roche Inc. Psoralens. 4,124,598, Cl. 260-343.210.
Heath, Roderick C. Portable and convertible washstand. 4,123,977, Cl. 108-25.000.
Heffelfinger, Richard H., to General Electric Company. Tubular solar collector. 4,124,019, Cl. 126-271.000.
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Helm, James H., to RCA Corporation. Rotational restraint for a video disc package. 4,124,118, Cl. 206-310.000.
Hemmat, Naim; Labelle, Harold E., Jr.; and Lamport, Charles, to Tyco Laboratories, Inc. Method of chemically sharpening monocrystalline ribbon. 4,124,698, Cl. 156-637.000.
Hemphill, Charles W. Method of excavating earth with a bucket. 4,123,861, Cl. 37-195.000.
Henderson, James A.; and Oliver, Pamela D., to Westinghouse Electric Corp. Rotary fiber optic waveguide coupling. 4,124,272, Cl. 350-96.210.
Henderson, Larry D., to United States of America, Navy. Distillation technique for removal of UDMH from water. 4,124,452, Cl. 203-56.000.
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Henzl, Jerry, to Crane Packing Co. Mechanical bond. 4,124,676, Cl. 264-250.000.
Herber, Richard J., to Solid State Scientific Inc. Bistable semiconductor flip-flop having a high resistance feedback. 4,124,807, Cl. 307-279.000.
Herdzina, Frank J.; and Urso, Patrick F., to American Can Company. Apparatus for applying a decoration to a cylindrical body. 4,124,433, Cl. 156-456.000.
Herrick, Burkett C., to Tuff-Kote Dinol, Inc. Surface-gloss measuring device. 4,124,303, Cl. 356-445.000.
Herrig, Klaus; and Wagner, Heinz, to Acieries Reunies de Burbach-Eich-Dudelange S.A. Arbed. Roll of wire mesh of the chain-link fencing type. 4,124,183, Cl. 245-6.000.
Herschberg, Allan F. Weather seal. 4,123,875, Cl. 49-482.000.
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Herzl, Peter J.; and Shaffer, Robert G., to Fischer & Porter Company. Transmission system for vortex-shedding flowmeter. 4,123,940, Cl. 73-194.0VS.
Hesse, Jurgen; and Schulzki, Dieter, to Messer Griesheim GmbH. Exhaust gas vent tube. 4,124,137, Cl. 220-86.00R.
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Hileman, Dale L. Variable sinusoidal oscillator. 4,124,827, Cl. 331-135.000.
Hill, David T.; Lantos, Ivan; and Sutton, Blaine M., to SmithKline Corporation. Preparation of auranofin by O-acetylation. 4,124,759, Cl. 536-121.000.
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Hill, William F.; and Jukes, Norman A., to Lucas Industries Limited. Spark ignition system for an internal combustion engine. 4,124,009, Cl. 123-148.00E.
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Himmel, David P., to Recognition Equipment Incorporated. Apparatus and method for reading randomly oriented characters. 4,124,797, Cl. 235-467.000.
Hipskind, Myron M. Portable device for screening off an accident scene from view. 4,124,196, Cl. 256-1.000.
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Hisamoto, Iwao; Maeda, Chiaki; Deguchi, Takayuki; Omure, Yukio; and Onishi, Takasi, to Daikin Kogyo Kabushiki Kaisha. Dry cleaning composition. 4,124,517, Cl. 252-89.0DC.
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Hobbs, Millice F.; and Green, Arthur C., to FMC Corporation. Sewage treatment system. 4,124,499, Cl. 210-28.000.
Hocker, Jurgen; Diehr, Hans-Joachim; and Merten, Rudolf, to Bayer Aktiengesellschaft. Carbamic acid esters as catalysts for trimerization of isocyanates. 4,124,545, Cl. 521-129.000.
Hoechst Aktiengesellschaft: *See*—
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Confalone, Pasquale N.; Lollar, Elizabeth D.; Pizzolato, Giacomo; and Uskokovic, Milan R., 4,124,595, Cl. 260-332.20A.
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Honeywell Information Systems Inc.: *See—*
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Weller, Edward F., III; and Porter, Marion G., 4,124,891, Cl. 364-200.000.
Hook, Rollin E.: *See—*
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Hoornstra, Clayton W.; and Stevens, Violete L., to Dow Chemical Company, The. Gelled photopolymer composition for article in relief. 4,124,389, Cl. 96-35.100.
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Howard, Robert E. Fire extinguisher. 4,124,076, Cl. 169-30.000.
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Huber, Warren Charles. Multi-effect portable camera vignette. 4,124,859, Cl. 354-296.000.
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Hughes, Charles R.; and Humphries, Darral V., to Bethlehem Steel Corporation. Sealed wire rope. 4,123,894, Cl. 57-220.000.
Hughes, Richard S.; and Thompson, Julian L., to United States of America, Navy. Ultrafast scanning spectrophotometer. 4,124,297, Cl. 356-308.000.
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Huntsinger, Dean P.; and Pearson, Thomas A., to Rockwell International Corporation. Multiplexed digital/analog conversion of plural digital signals. 4,124,845, Cl. 340-347.0DA.
Hurwitz, Mathew. Carpet and floor washing accessory for wet pick-up-vacuum cleaners. 4,123,818, Cl. 15-321.000.
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Hutchins, Warwick B., to B.B.R. Australia Pty. Ltd. Adjustable tie rod holder. 4,124,321, Cl. 403-167.000.
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Ibamoto, Masahiko: *See—*
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Ihara Chemical Industry Co., Ltd.: *See—*
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Iida, Hiroshi, to Nissan Motor Company, Ltd. Exhaust port liner for multi-cylinder internal combustion engine. 4,123,902, Cl. 60-282.000.
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International Computers Limited: *See—*
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International Fastener Establishment: *See—*
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International Harvester Company: *See—*
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International Nickel Company, Inc., The: *See—*
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International Salt Company: *See—*
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International Standard Electric Corporation: *See—*
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International Telephone and Telegraph Corporation: *See—*
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Itoh, Kinya; Tanaka, Shigeaki; Shimizu, Gen; and Suganuma, Yuzi, to Hitachi, Ltd. Clothes drier. 4,123,851, Cl. 34-48.000.

Itoh, Takuji; Sakurada, Satoshi; and Tagaya, Nobuaki, to Toa Nenryo Kogyo Kabushiki Kaisha. Catalyst for reducing nitrogen oxides. 4,124,536, Cl. 252-455.00R.

Itoh, Yoshiharu; Iwatsuki, Makoto; Suzuki, Kazuhiro; and Seko, Tatuya, to Nippondenso Co., Ltd. Method for assembling a fuel pump to an internal combustion engine. 4,123,835, Cl. 29-156.40R.

ITW Limited: *See—*
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Iwai, Sakuya: *See—*
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Iwatsuki, Makoto: *See—*
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Jabsen, Felix S.; Schluderberg, Donald C.; and Paulson, Arnold E., to Babcock & Wilcox Company, The. Consolidated nuclear steam generator. 4,124,064, Cl. 165-69.000.

Jabsen, Felix S., to Babcock & Wilcox Company, The. Nuclear fuel rod supporting arrangement. 4,124,444, Cl. 176-78.000.

Jackson, Robert W.: *See—*
Brown, Arthur K.; Baker, Donald J.; and Jackson, Robert W., 4,123,965, Cl. 92-136.000.

Jacobs, Stanley C.; and King, Larry K., to Aluminum Company of America. Method of producing high purity aluminum chloride. 4,124,682, Cl. 423-495.000.

Jacobsen, George H.: *See—*
Wright, John H.; and Jacobsen, George H., 4,123,958, Cl. 83-837.000.

Jacoby, Charles H., to International Salt Company. Pollution-free power generating and peak power load shaving system. 4,124,805, Cl. 290-1.00R.

Jadach, Albert A.: *See—*
Chaivre, Joseph W.; and Jadach, Albert A., 4,123,961, Cl. 85-35.000.

James B. Paull & Co., Inc.: *See—*
Paull, James B., 4,124,017, Cl. 126-270.000.

James, Claude: *See—*
Fabre, Jean-Louis; Farge, Daniel; and James, Claude, 4,124,596, Cl. 260-332.20A.

Jankowski, Richard F.: *See—*
Zabron, Floyd S.; and Jankowski, Richard F., 4,124,423, Cl. 156-88.000.

Janotik, Adam M., to Ford Motor Company. Electric vehicle drive train having unipolar motor. 4,124,086, Cl. 180-65.00R.

Janousek, Karel: *See—*
Zizka, Jaroslav; Janousek, Karel; and Papanek, Miroslav, 4,124,033, Cl. 131-10.900.

Janquart, Jerry C.: *See—*
Priese, Werner K.; Janquart, Jerry C.; and Stanley, Deryl B., 4,124,147, Cl. 222-135.000.

Japan Air Lines Company, Ltd.: *See—*
Nakamura, Shinji; and Mihirogi, Kiyoshi, 4,123,976, Cl. 104-148.0MS.

Japan Inorganic Material Co., Ltd.: *See—*
Kawai, Motochika, 4,124,363, Cl. 65-2.000.

Jarsen, Manfred H., to MCA Disco-Vision, Inc. Replication utilizing a casting process. 4,124,672, Cl. 264-129.000.

Jarvis, Wilbur W.; and Toth, Leslie, to Whirlpool Corporation. Fluid discharge device. 4,124,165, Cl. 239-548.000.

Jaschke, Artur: *See—*
Wilhelm, Gerd; Jaschke, Artur; Simon, Hans-Jurgen; Schmidt, Jens; and Sandhu, Surinder S., 4,124,666, Cl. 264-39.000.

Jaworski, Eugene: *See—*
Breslow, Jeffrey D.; Spinello, John O.; and Jaworski, Eugene, 4,124,207, Cl. 273-1.00R.

Jeanmart, Claude; and Leger, Andre, to Rhone-Poulenc Industries. Derivatives of dithiepino[1,4][2,3-C]pyrrole. 4,124,711, Cl. 424-250.000.

Jedzinak, John E., to Revlon, Inc. Soaps containing encapsulated oils. 4,124,521, Cl. 252-127.000.

Jenkins, Colle L., Jr., to Du Pont de Nemours, E. I., and Company. Preparation of tetrahydrofuran. 4,124,600, Cl. 260-346.110.

Jeser, Jean-Pierre: *See—*
Danielmeyer, Hans-Gunter; Jeser, Jean-Pierre; Kruhler, Walter W.; Schonherr, Erich; and Huber, Gunter, 4,124,524, Cl. 252-301.10R.

Jewett, David N., to Mobil Tyco Solar Energy Corp. Manufacture of silicon on the inside of a tube. 4,123,989, Cl. 118-49.500.

Jilek, Rudolf: *See—*
Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; Nemec, Pavel; Katzer, Josef; and Stastny, Karel, 4,124,544, Cl. 521-26.000.

Jim Walter Resources, Inc.: *See—*
Albert, Frank D.; Conroy, Alan P.; and Skinner, David L., 4,124,730, Cl. 427-220.000.

Jimmy Dean Meat Company, Inc., The: *See—*
Bernard, Vincent E., 4,124,339, Cl. 425-133.100.

Jindal, Prem C.: *See—*
Jones, William R.; and Jindal, Prem C., 4,124,199, Cl. 266-88.000.

Jochelson, Albert: *See—*
Kurdowski, Wieslaw; Makowski, Henryk; Sobczuk, Roman; Szczepanik, Zenobiusz; Jochelson, Albert; Chomicki, Leszek; Thiel, Aleksandra; Jochelson, Aleksander; and Krupa, Zygmunt, 4,124,378, Cl. 75-10.00R.

Jochelson, Aleksander: *See—*
Kurdowski, Wieslaw; Makowski, Henryk; Sobczuk, Roman; Szczepanik, Zenobiusz; Jochelson, Albert; Chomicki, Leszek; Thiel, Aleksandra; Jochelson, Aleksander; and Krupa, Zygmunt, 4,124,378, Cl. 75-10.00R.

Joh, Yasushi, to Nippon Zeon Co., Ltd. Cross-flow, hollow-fiber permeability apparatus having slit-like inlet means. 4,124,510, Cl. 210-321.00B.

John Thomas Batts, Inc.: *See—*
Batts, John H.; and Garrison, Judd F., 4,123,864, Cl. 40-322.000.

John Zink Company: *See—*
Reed, Robert D.; Hart, Wallace F.; and Cegielski, John M., 4,124,681, Cl. 423-210.000.

Johns-Manville Corporation: *See—*
Byrd, Carlisle O., Jr., 4,123,886, Cl. 52-509.000.

Johnson, Charles R.: *See—*
Bredeson, Dean K.; Craig, Gregory C.; Gilius, William J.; and Johnson, Charles R., 4,124,306, Cl. 366-75.000.

Johnson, David E., to Mobil Oil Corporation. Poppet check valve for controlled feeding of blowing agent. 4,124,336, Cl. 425-4.00C.

Johnson, Donald B.: *See—*
Vick, Howard A.; and Johnson, Donald B., 4,124,894, Cl. 364-417.000.

Johnson, Gary D.; Levie, Michael M.; Freese, Donald R.; Lee, Robert W.; and Paufve, Eldred H., to Universal Instruments Corporation.

Real time computer control system for automatic machines. 4,124,887, Cl. 364-107.000.
Johnson, Gerald L.; Huff, Joe T.; and Sanders, Weldon A., Jr., to Levi Strauss & Co. Marker projector system. 4,124,285, Cl. 353-28.000.
Johnson, Herman D., to Optron, Inc. Optical coupler. 4,124,860, Cl. 357-19.000.
Johnson, Keith O.; Blackmer, David E.; and Mosely, John deS., to DBX, Inc. Motion picture sound system. 4,124,784, Cl. 179-100.30R.
Johnson, Robert A., to Xerox Corporation. Impact printer with print wheel cartridge. 4,124,312, Cl. 400-144.200.
Johnson, Robert D., to Dow Corning Corporation. Silicone-containing acidic cleaner and conditioner. 4,124,523, Cl. 252-145.000.
Johnston, David H.: *See—*
Patel, Pravin K.; Johnston, David H.; and Makaeff, John, 4,124,736, Cl. 428-622.000.
Jones, John A.; and Procter, Brian J., to International Computers Limited. Data processing systems. 4,124,892, Cl. 364-200.000.
Jones, William R.; and Jindal, Prem C., to Abar Corporation. Process and apparatus for case hardening of ferrous metal work pieces. 4,124,199, Cl. 266-88.000.
Jons, Claus; Schonherr, Erich; and Wolff, Gunter, to Robert Bosch GmbH. Interengaging gear machine with compensating force on bearing members. 4,124,335, Cl. 418-73.000.
Jonvin Corporation: *See—*
Breisch, John H., 4,124,093, Cl. 182-181.000.
Joyce, Thomas F.; and Raguin, Michel M., to Honeywell Information Systems Inc. Microword address branching bit arrangement. 4,124,893, Cl. 364-200.000.
Juditsky, Davlet I.: *See—*
Vasenkov, Alexandr A.; Dshkhunian, Valery L.; Mashevich, Pavel R.; Nesterov, Petr V.; Telenkov, Vyacheslav V.; Chicherin, Jury E.; and Juditsky, Davlet I., 4,124,890, Cl. 364-200.000.
Juergens, Alfred R., to Fleet Engineers, Inc. Door catch. 4,124,184, Cl. 248-66.000.
Jukes, Norman A.: *See—*
Hill, William F.; and Jukes, Norman A., 4,124,009, Cl. 123-148.00E.
Junker, Ralph D. Firearm and caseless ammunition therefor. 4,123,963, Cl. 89-152.000.
Juntgen, Harald; Schumacher, Horst; Klein, Jurgen; Knoblauch, Karl; Schroter, Hans-Jurgen; Kolling, Georg; and Romey, Ingo, to Bergwerksverband GmbH. Carbonaceous adsorbents and process for making same. 4,124,529, Cl. 252-421.000.
Kabushiki Kaisha Audio-Technica: *See—*
Nemoto, Mitsuo, 4,124,783, Cl. 179-100.41K.
Kabushiki Kaisha Daini Seikosha: *See—*
Asano, Kazuhiro; Ishikawa, Takehiro; Yasuda, Kazumasa; and Ishijima, Takashi, 4,123,896, Cl. 58-39.500.
Miyazaki, Joichi, 4,123,895, Cl. 58-23.0BA.
Sano, Motohiro; and Ohki, Ryoichi, 4,123,897, Cl. 58-59.000.
Kabushiki Kaisha Yamazaki Tekkosho: *See—*
Yoshida, Motohiko; and Katagiri, Nobuyuki, 4,124,327, Cl. 408-140.000.
Kachalin, Vladimir S.: *See—*
Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.
Kagata, Tooru, to Aisin Seiki Kabushiki Kaisha. Differential gear mechanism for vehicles. 4,123,951, Cl. 74-711.000.
Kaiser Aerospace & Electronics Corporation: *See—*
Morrison, Donald L., 4,124,228, Cl. 285-1.000.
Kajava, Antero, to Paraisten Kalkki Oy - Pargas Kolk Ab. Lengthening joint for concrete objects. 4,123,888, Cl. 52-726.000.
Kajiya, Sadao; Atsumi, Tomiaki; Kuroda, Osamu; and Nakakubo, Tamio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Muffler for automobiles. 4,124,092, Cl. 181-265.000.
Kaken Chemical Co., Ltd.: *See—*
Hamazaki, Yasuhiko; Kawabata, Shozo; Yamamoto, Toshiyuki; Shiraishi, Yasuo; Ueno, Akira; Amemiya, Koji; and Saga, Katsumas, 4,124,726, Cl. 424-331.000.
Kalopissis, Gregoire; and Vanlerberghe, Guy, to Societe Anonyme dite l'Oreal. Surface active agents. 4,124,632, Cl. 260-501.130.
Kalsi, Manmohan S.: *See—*
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Kaneda, Hiroshi: *See—*
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Kano, Shoji: *See—*
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Kao, Jar-lin; and Leonard, John J., to Atlantic Richfield Company. Process for the liquid phase oxidation of α,β-unsaturated aldehydes to α,β-unsaturated acids using zinc catalysts. 4,124,635, Cl. 562-533.000.
Kao, Jar-lin: *See—*
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Kao Soap Company: *See—*
Azuma, Minoru; Tamura, Junichi; and Mori, Zenichi, 4,124,543, Cl. 252-8.600.
Kaplowitz, Arthur R. Board game apparatus. 4,124,213, Cl. 273-248.000.
Karam, James T., Jr.: *See—*
Berg, Norman J.; and Karam, James T., Jr., 4,124,280, Cl. 350-358.000.
Karl Lautenschlager KG Mobelbeschlagfabrik: *See—*
Lautenschlager, Gerhard W., 4,123,823, Cl. 16-145.000.
Kasahara, Yasuo, to Tokyo Kinzoku Co. Ltd. Circuit breaker. 4,124,831, Cl. 335-16.000.
Kasdan, Harvey L.: *See—*
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Katagiri, Nobuyuki: *See—*
Yoshida, Motohiko; and Katagiri, Nobuyuki, 4,124,327, Cl. 408-140.000.
Kato, Shinichi; Watanabe, Kiyoto; and Otani, Shuichi, to Nissan Motor Company, Ltd. Electric plug assembly. 4,124,264, Cl. 339-59.00M.
Kattner, Erich; and Kindler, Wilfried, to Siemens Aktiengesellschaft. Hydraulic dampening device in an ink supply system of an ink operated mosaic printer unit. 4,124,853, Cl. 346-140.00R.
Katzer, Josef: *See—*
Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; Nemec, Pavel; Katzer, Josef; and Stastny, Karel, 4,124,544, Cl. 521-26.000.
Kauffman, Joel M., to New England Nuclear Corporation. Compositions and process for liquid scintillation counting. 4,124,527, Cl. 252-408.000.
Kaufman, Phillip A.; and Washburn, Jerry R., to Computer Automation, Inc. Distributed input/output controller system. 4,124,889, Cl. 364-200.000.
Kawabata, Shozo: *See—*
Hamazaki, Yasuhiko; Kawabata, Shozo; Yamamoto, Toshiyuki; Shiraishi, Yasuo; Ueno, Akira; Amemiya, Koji; and Saga, Katsumas, 4,124,726, Cl. 424-331.000.
Kawai, Motochika, to Japan Inorganic Material Co., Ltd. Method and apparatus for manufacturing inorganic fiber through pendent process and apparatus for carrying out the same. 4,124,363, Cl. 65-2.000.
Kawai, Shinji: *See—*
Oguma, Tomio; Kawai, Shinji; Minamoto, Naoki; Yamaguchi, Yuji; and Makino, Tetsuo, 4,123,807, Cl. 4-7.000.
Kawai, Yoshihisa: *See—*
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Kawamura, Atsushi; and Fukushima, Yoshio, to Ricoh Company, Ltd. Light source for multiple image projection device. 4,124,882, Cl. 362-300.000.
Kawamura, Masao; Hatta, Masakazu; Koune, Nobuhiro; and Kitagishi, Nobuyuki, to Seitetsu Kagaku Co., Ltd. Process for producing thioanisole. 4,124,646, Cl. 260-609.00E.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
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Kawase, Shoji: *See—*
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Kazel, William G.: *See—*
Peters, Mark A.; and Kazel, William G., 4,124,379, Cl. 75-118.00R.
Kedian, Harold F., Jr. Multi-terminal connector element. 4,124,788, Cl. 200-51.00R.
Keizer, Eugene O.: *See—*
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Kelly, James A. Open-face spinning reel. 4,124,174, Cl. 242-84.20R.
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Knight, Charles E., Jr.; Kelly, James J.; and Pollard, Roy E., 4,123,949, Cl. 74-572.000.
Kelly, Robert C., to Upjohn Company, The. Enlarged-hetero-ring prostacyclin analogs. 4,124,599, Cl. 260-345.200.
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Nordblom, George F.; Turillon, Pierre P.; Huston, Ernest L.; and Keresztes, Stephan L., 4,124,746, Cl. 429-210.000.
Keske, Robert G., to Standard Oil Company. Self-bonding varnish for magnet wire and magnets produced using said. 4,124,419, Cl. 156-51.000.
Kettunen, John. Motion detection device. 4,124,841, Cl. 340-690.000.
Keuper, Erich: *See—*
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Keystone Consolidated Industries, Inc.: *See—*
Schill, John M., 4,124,262, Cl. 312-305.000.
Kiejzik, Paul A. Microfilm jacket microfilm-feeding process. 4,123,891, Cl. 53-435.000.
Kienzle Apparate GmbH: *See—*
Schmidt, Helmut; Strobel, Walter; Treude, Gunter; and Blaser, Paul, 4,124,313, Cl. 400-491.200.
Kim, Chang J.; and Farcasiu, Dan, to Exxon Research & Engineering Co. Preparation of anhydrous TaF_5. 4,124,692, Cl. 423-492.000.
Kindler, Wilfried: *See—*
Kattner, Erich; and Kindler, Wilfried, 4,124,853, Cl. 346-140.00R.
Kine, Masayoshi, to Shimano Industrial Company Limited. Multistage freewheel for bicycles. 4,124,107, Cl. 192-64.000.

King, Christopher J. H.: *See—*
Fleischmann, Martin; Goodridge, Francis; and King, Christopher J. H., 4,124,453, Cl. 204-1.00R.
King, David W.; and Pipes, Robert K., to Gearhart-Owen Industries, Inc. Wireline shifting tool apparatus and methods. 4,124,070, Cl. 166-255.000.
King, Larry K.: *See—*
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King-Seeley Thermos Co.: *See—*
Kohl, Vance L.; and Hoenisch, Walter H., 4,123,918, Cl. 62-320.000.
Spinner, Joseph R.; and Baker, Melvin A., 4,124,145, Cl. 222-56.000.
Kinrade, Stephen S., to Frangos Brothers & Co. Ltd. Structures for housing livestock. 4,123,991, Cl. 119-10.000.
Kinsman, Gordon F.: *See—*
Land, Edwin H.; and Kinsman, Gordon F., 4,124,742, Cl. 429-122.000.
Kircher, John C. Speaker comparator devices and methods of making and using the same. 4,124,786, Cl. 179-175.10A.
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Kirsch, Aloys; Fuchs, Otto; and Spietschka, Ernst, to Hoechst Aktiengesellschaft. Process for preparing pure substituted 2,5-diarylaminoterephthalates and the corresponding free acids. 4,124,768, Cl. 560-19.000.
Kirtikar, Suvrat, to Varian Associates, Inc. Electrostatic recorder with a recording head which floats on a fluid cushion. 4,124,854, Cl. 346-155.000.
Kirzner, Felix I.: *See—*
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Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, to Canon Kabushiki Kaisha. Original urging device. 4,124,296, Cl. 355-75.000.
Kishimoto Sangyo Co., Ltd.: *See—*
Kubota, Shigeru; Kano, Shoji; and Kubo, Masahiro, 4,124,729, Cl. 427-58.000.
Kiss, William, to Science Accessories Corporation. Apparatus for position determination. 4,124,838, Cl. 340-1.00R.
Kistler Instrumente AG: *See—*
Vollenweider, Max, 4,124,877, Cl. 361-393.000.
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Kiyono, Hiroshi; Ishimoto, Akio; Noda, Yoichiro; and Yada, Kozo, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Apparatus for continuously producing foamed sheets. 4,124,344, Cl. 425-174.400.
Klaus, Gerald R., to Fellowes Manufacturing Company. Data storage unit. 4,124,261, Cl. 312-183.000.
Klein, Jurgen: *See—*
Juntgen, Harald; Schumacher, Horst; Klein, Jurgen; Knoblauch, Karl; Schroter, Hans-Jurgen; Kolling, Georg; and Romey, Ingo, 4,124,529, Cl. 252-421.000.
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Knapp, Karl; and Prause, Siegfried, to Varta Batterie AG. Accumulator with plate element having a rib for securing to cell wall. 4,124,745, Cl. 429-208.000.
Knapp, Robert L.: *See—*
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Knifton, John F., to Texaco Development Corporation. Process for preparing unsaturated aliphatic esters from aliphatic dienes. 4,124,617, Cl. 260-410.000.
Knight, Bill J. Method and apparatus for casting anodes. 4,124,482, Cl. 204-293.000.
Knight, Charles E., Jr.; Kelly, James J.; and Pollard, Roy E., to United States of America, Energy. Inertial energy storage device. 4,123,949, Cl. 74-572.000.
Knoblauch, Karl: *See—*
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Knorre, Helmut; Langer, Manfred; and Fischer, Wolfgang, to Deutsche Gold und-Silber-Scheideanstalt vormals Roessler. Setting retarder. 4,124,406, Cl. 106-111.000.
Knott, Philip H. Toy tea kettle. 4,123,871, Cl. 46-14.000.
Knowles, William S.; and Sabacky, Milton J., to Monsanto Company. Metal coordination complexes containing optically active phosphine or arsine ligands. 4,124,533, Cl. 252-431.00P.
Kobayashi, Kunimitsu, to Shingo Kizai Kabushiki Kaisha. Alarm system. 4,124,840, Cl. 340-501.000.
Kobayasshi, Takashi; and Iwai, Sakuya, to Nippon Oil Co., Ltd. Clay pigeon. 4,124,550, Cl. 260-23.300.
Koch, Heinrich; and Lehnen, Josef, to Bayer Aktiengesellschaft. Compaction of pulverized rubber mixtures. 4,124,559, Cl. 260-33.6AQ.
Koehnlein, Ernst; Glaser, Rudolf; and Koessler, Ludwig, to BASF Aktiengesellschaft. Electrical insulating compositions based on ethylene/vinyl acetate copolymers. 4,124,655, Cl. 260-878.00R.
Koessler, Ludwig: *See—*
Koehnlein, Ernst; Glaser, Rudolf; and Koessler, Ludwig, 4,124,655, Cl. 260-878.00R.
Kohl, Vance L.; and Hoenisch, Walter H., to King-Seeley Thermos Co. Ice dispensing machine. 4,123,918, Cl. 62-320.000.
Kohn, Victor E., to Recognition Systems, Inc. Dye toning system. 4,124,390, Cl. 96-57.000.
Kohriyama, Yoshimasa, to Caterpillar Mitsubishi Ltd. Noise reduction device for use in the undercarriage of track-type vehicles. 4,124,255, Cl. 305-41.000.
Kohrt, Carl F., to Eastman Kodak Company. Positive images in photothermographic materials containing nitroxyl compounds. 4,124,387, Cl. 96-29.00D.
Kohrt, Carl F.: *See—*
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Kokusai Denshin Denwa Co., Ltd.: *See—*
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Koleske, Joseph V.; and Smith, Oliver W., to Union Carbide Corporation. Water soluble, high solids urethane coating compositions. 4,124,552, Cl. 260-29.2TN.
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Kolosov, Ivan A. Device for longitudinal cutting of thermo-softening materials into strips. 4,123,954, Cl. 83-171.000.
Koltermann, Jurgen K. D.: *See—*
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Kolwey, Herman G. Helicopter external load pickup system. 4,124,181, Cl. 244-137.00R.
Komatsu, Yasuhiko; and Kanbara, Shozo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Wear and pitting resistant cast iron. 4,124,413, Cl. 148-3.000.
Kondo, Renichi: *See—*
Suzuki, Gyoichi; Ando, Ryo; Koyama, Tatsuo; Kubodera, Shoji; and Kondo, Renichi, 4,124,404, Cl. 106-103.000.
Kondo, Satoshi: *See—*
Shibazaki, Hiroji; Edagawa, Setsuji; Hasegawa, Hisashi; and Kondo, Satoshi, 4,124,688, Cl. 423-432.000.
Konersmann, Alwin, to Durkoppwerke GmbH. Thread-cutter device for double lock stitch sewing machine. 4,123,986, Cl. 112-289.000.
Korstad, Ralph J.: *See—*
Allen, Joseph C.; and Korstad, Ralph J., 4,124,071, Cl. 166-263.000.
Koszi, Louis A.: *See—*
Dixon, Richard W.; Koszi, Louis A.; and Nash, Franklin R., 4,124,826, Cl. 331-94.50H.
Kotval, Peshotan S.; and Strock, Harold B., to Union Carbide Corporation. Silicon solar cells with low-cost substrates. 4,124,410, Cl. 136-89.0TF.
Koune, Nobuhiro: *See—*
Kawamura, Masao; Hatta, Masakazu; Koune, Nobuhiro; and Kitagishi, Nobuyuki, 4,124,646, Cl. 260-609.00E.
Kovalenchik, Davyd I.: *See—*
Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.
Kowalski, Gerald L., to Four Star Corporation. Luggage rack. 4,124,155, Cl. 224-42.10D.
Koyama, Tatsuo: *See—*
Suzuki, Gyoichi; Ando, Ryo; Koyama, Tatsuo; Kubodera, Shoji; and Kondo, Renichi, 4,124,404, Cl. 106-103.000.
Kraftwerk Union Aktiengesellschaft: *See—*
Bezold, Helmut, 4,124,443, Cl. 176-78.000.
Kramer, Carl; and Gerhardt, Hans J., to Bayer Aktiengesellschaft. Artificial heart valve. 4,123,805, Cl. 3-1.500.
Kramer, Wolfgang; Draber, Wilfried; Buchel, Karl H.; Brandes, Wilhelm; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Combating fungi and controlling plant growth with 1-amido-1-azolyl-2-hydroxy- or -keto-alkanes. 4,124,369, Cl. 71-76.000.
Kreger, Thomas C., to Ford Motor Company. Automotive heat pump. 4,123,916, Cl. 62-243.000.
Kreinick, Stephen J.; Musa, Fuad H.; and Shaw, Pern, to Motorola, Inc. Voltage subtractor for serial-parallel analog-to-digital converter. 4,124,824, Cl. 330-252.000.
Kriegesmann, Edwin P.: *See—*
Murray, Orin L.; and Kriegesmann, Edwin P., 4,124,018, Cl. 126-271.000.
Kriz, Otomar: *See—*
Casensky, Bohuslav; Machacek, Jiri; Kriz, Otomar; and Kubanek, Vladimir, 4,124,584, Cl. 260-239.30R.
Kruhler, Walter W.: *See—*
Danielmeyer, Hans-Gunter; Jeser, Jean-Pierre; Kruhler, Walter W.; Schonherr, Erich; and Huber, Gunter, 4,124,524. Cl. 252-301.10R.
Krupa, Zygmunt: *See—*
Kurdowski, Wieslaw; Makowski, Henryk; Sobczuk, Roman; Szczepanik, Zenobiusz; Jochelson, Albert; Chomicki, Leszek;

Thiel, Aleksandra; Jochelson, Aleksander; and Krupa, Zygmunt, 4,124,378, Cl. 75-10.00R.
Kryschuk, John J.: *See*—
Sprecker, Mark A.; Kryschuk, John J.; and Hall, John B., 4,124,644, Cl. 260-602.000.
Kubanek, Vladimir: *See*—
Casensky, Bohuslav; Machacek, Jiri; Kriz, Otomar; and Kubanek, Vladimir, 4,124,584, Cl. 260-239.30R.
Kubelka, Axel R., to TMC Corporation. Ski brake. 4,124,223, Cl. 280-605.000.
Kubo, Masahiro: *See*—
Kubota, Shigeru; Kano, Shoji; and Kubo, Masahiro, 4,124,729, Cl. 427-58.000.
Kubodera, Shoji: *See*—
Suzuki, Gyoichi; Ando, Ryo; Koyama, Tatsuo; Kubodera, Shoji; and Kondo, Renichi, 4,124,404, Cl. 106-103.000.
Kubota, Ltd.: *See*—
Kusano, Hiroshi, 4,124,422, Cl. 156-165.000.
Kubota, Naohiro: *See*—
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,124,564, Cl. 260-45.80N.
Kubota, Shigeru; Kano, Shoji; and Kubo, Masahiro, to Kishimoto Sangyo Co., Ltd. Method of multiple powder coating employing geneva gears. 4,124,729, Cl. 427-58.000.
Kubota Tekko Kabushiki Kaisha: *See*—
Nakatani, Shuhichi, 4,123,884, Cl. 52-220.000.
Kuczkowski, Joseph A., to Goodyear Tire & Rubber Company, The. N,N'-disubstituted-p-phenylenediamines. 4,124,565, Cl. 260-45.9QB.
Kuenemund, Friedrich, to Siemens Aktiengesellschaft. Electromechanical filter. 4,124,829, Cl. 333-71.000.
Kuenstler, Paul G. Lockable desk receptacle. 4,123,922, Cl. 70-58.000.
Kuenzel, Rainer. Well tool. 4,124,245, Cl. 294-86.300.
Kulon, Robert E.: *See*—
Rosin, George C.; and Kulon, Robert E., 4,124,133, Cl. 214-707.000.
Kumbera, David G.; and Bordak, John A., to McGraw-Edison Company. Protective switch device and operating mechanism therefor. 4,124,790, Cl. 200-144.00B.
Kummli, Paul: *See*—
Daniels, Raymond A.; and Kummli, Paul, 4,124,293, Cl. 355-58.000.
Kunkel, Lorenz V., to Standard Oil Company (Indiana). Method for sealing leakage across valves in a sulfur recovery plant. 4,124,696, Cl. 423-574.00R.
Kupfer-Asbest-Co. Gustav Bach: *See*—
Uhrner, Klaus-Jurgen, 4,124,219, Cl. 277-40.000.
Kurdowski, Wieslaw; Makowski, Henryk; Sobczuk, Roman; Szczepanik, Zenobiusz; Jochelson, Albert; Chomicki, Leszek; Thiel, Aleksandra; Jochelson, Aleksander; and Krupa, Zygmunt, to Huta Siechnice. Method of solidifying the slag obtained in ferrochromium production. 4,124,378, Cl. 75-10.00R.
Kureha Kagaku Kogyo Kubushiki Kaisha: *See*—
Onozuka, Mitsuo; Nomoto, Koki; and Endo, Kiichi, 4,124,563, Cl. 260-42.240.
Kurisu, Shizuka: *See*—
Saiki, Noritsugu; Kurisu, Shizuka; and Kawase, Shoji, 4,124,566, Cl. 528-177.000.
Kuriyama, Sigeru; and Kaminaga, Minoru, to Hitachi, Ltd. Safety device for a vehicle. 4,124,088, Cl. 180-105.00E.
Kuroda, Osamu: *See*—
Kajiya, Sadao; Atsumi, Tomiaki; Kuroda, Osamu; and Nakakubo, Tamio, 4,124,092, Cl. 181-265.000.
Kurono, Masayasu; Chiba, Takeshi; and Fujii, Setsuro, to Ono Pharmaceutical Co., Ltd. 5-Fluorouracil derivatives. 4,124,765, Cl. 544-313.000.
Kurosu, Tomio: *See*—
Shigeru, Yasuo; and Kurosu, Tomio, 4,124,283, Cl. 352-91.00C.
Kurz, Craven H. Vibrational mouth pad orthodontic appliance. 4,123,844, Cl. 32-14.00D.
Kusano, Hiroshi, to Kubota, Ltd. Method of producing flexible pipe with socket section. 4,124,422, Cl. 156-165.000.
Kustom Fit Manufacturing Company: *See*—
Aldana, Elphious, 4,123,811, Cl. 5-43.000.
Kuwano, Masao: *See*—
Watabe, Yoji; Ishii, Michio; Kaneda, Hiroshi; Ino, Fumitaka; Kuwano, Masao; Ura, Yasuyuki; and Anzai, Shiro, 4,124,573, Cl. 528-53.000.
Kuzmin, Sergei V., to Novosibirsky Institut Organicheskoi Khimii Sibirskogo Otdelenia Akademii Nauk SSSR. Device for photometering a substance placed in a cylinder-shaped cell. 4,124,302, Cl. 356-440.000.
Kwasnoski, Daniel: *See*—
Tarhan, Mehmet O.; and Kwasnoski, Daniel, 4,124,685, Cl. 423-574.00L.
Labadie, Xavier R.; and Velte, Andre J., to Societe Anonyme de Telecommunications. Dual mica capacitor. 4,124,876, Cl. 361-325.000.
Labaz: *See*—
Descamps, Marcel; and Areschka, Alex, 4,124,710, Cl. 424-248.560.
Label-Aire Inc.: *See*—
Crankshaw, Michael, 4,124,429, Cl. 156-364.000.
Labelle, Harold E., Jr.: *See*—
Hemmat, Naim; Labelle, Harold E., Jr.; and Lamport, Charles, 4,124,698, Cl. 156-637.000.
Laberge, J. G. Jacques: *See*—
Fung, David T.; Laberge, J. G. Jacques; and Przystal, Frederick S., 4,124,492, Cl. 208-180.000.
Lafon, Louis, to Societe Anonyme dite: Laboratoire L. Lafon. Esters of bis-(hydroxyalkylthio)-alkanes. 4,124,706, Cl. 424-230.000.
Lalancette, Jean-Marc, to Universite de Sherbrooke. Recovery of magnesium from magnesium silicates. 4,124,683, Cl. 423-166.000.
Lampinen, Earl J.: *See*—
Niemela, W. Wally; and Lampinen, Earl J., 4,123,957, Cl. 83-796.000.
Lamport, Charles: *See*—
Hemmat, Naim; Labelle, Harold E., Jr.; and Lamport, Charles, 4,124,698, Cl. 156-637.000.
Lampson, George P.; Tytell, Alfred A.; Field, Arthur K.; and Hilleman, Maurice R., to Merck & Co., Inc. Polynucleotides active as inducers of interferon production in living animal cells. 4,124,702, Cl. 424-85.000.
Land, Edwin H.; and Kinsman, Gordon F., to Polaroid Corporation. Electrical cells and batteries and methods and apparatus for making the same. 4,124,742, Cl. 429-122.000.
Landwehr, Goetz: *See*—
Bauer, Peter; Dietzsch, Guenter; Landwehr, Goetz; and Schulin, Gotthilf, 4,123,843, Cl. 30-383.000.
Langen & Co.: *See*—
Strauff, Gunther, 4,123,964, Cl. 91-434.000.
Langer, Manfred: *See*—
Knorre, Helmut; Langer, Manfred; and Fischer, Wolfgang, 4,124,406, Cl. 106-111.000.
Lannert, Kent P., to Monsanto Company. Detergent compositions containing ketal polycarboxylate builder salts and methods employing the same. 4,124.519, Cl. 252-99.000.
Lantos, Ivan: *See*—
Hill, David T.; Lantos, Ivan; and Sutton, Blaine M., 4,124,759, Cl. 536-121.000.
Lapidus, Milton, to American Home Products Corporation. Antiovulatory polypeptides. 4,124,578, Cl. 260-112.5LH.
Largeron, Gerard: *See*—
Antoine, Lucien; Maubon, Andre; and Largeron, Gerard, 4,124,200, Cl. 266-158.000.
Larkin, John M., to Texaco Inc. Preparation of 2-oxoalkanoic acids. 4,124,608, Cl. 260-405.000.
Larson, Ulf Rutger, to Rutger Larson Konsult AB. Method and apparatus for producing atomized metal powder. 4,124,377, Cl. 75-0.50C.
LaSpisa, Ronald J.; and McElroy, Arthur H., to Phillips Petroleum Company. Control of pipe tension between extruder die and take-up coiler. 4,124,340, Cl. 425-135.000.
Latiolais, Rene L.; and Hranitzky, Walter W., to Freeport Minerals Company. Sulfur well sealing method. 4,124,253, Cl. 299-6.000.
Lauerman, Albert L., to Rockwell International Corporation. Magnetic displacement transducer wherein two relatively movable gratings vary the magnetic field coupled to a Hall plate proportional to the displacement. 4,124,814, Cl. 324-208.000.
Laugesen, Ronald C.: *See*—
Shieu, Mark S. D.; Laugesen, Ronald C.; and Dobkin, Robert C., 4,124,808, Cl. 307-362.000.
Laurenz, Frank R., to Agricultural Research & Development, Inc. Clean out system for animal facilities. 4,123,992, Cl. 119-16.000.
Lautenschlager, Gerhard W., to Karl Lautenschlager KG Mobelbeschlagfabrik. Over-center hinge. 4,123,823, Cl. 16-145.000.
Lawson, Bobbie G. Kicking shoe. 4,123,856, Cl. 36-133.000.
Lay, Joe B., to Fabricated Services, Inc. Fluid filter apparatus of standardized pipe dimension having interchangeable filter means positively secured therein. 4,124,511, Cl. 210-447.000.
Leang, William N.: *See*—
Otto, Paul R.; and Leang, William N., 4,124,103, Cl. 187-29.00R.
Lee, Gim F., Jr.: *See*—
Abolins, Visvaldis; and Lee, Gim F., Jr., 4,124,654, Cl. 260-876.00B.
Lee, Minyoung; Szala, Lawrence E.; and DeVries, Robert C., to General Electric Company. Polycrystalline diamond body. 4,124,401, Cl. 106-44.000.
Lee, Paul L.: *See*—
Brumley, Charles D.; Fancher, Alex, Jr.; and Lee, Paul L., 4,124,663, Cl. 264-3.00D.
Lee, Robert W.: *See*—
Johnson, Gary D.; Levie, Michael M.; Freese, Donald R.; Lee, Robert W.; and Paufve, Eldred H., 4,124,887, Cl. 364-107.000.
Lee, Thomas D.: *See*—
Ziegler, Michael J.; and Lee, Thomas D., 4,124,140, Cl. 220-304.000.
Leff, Andrew: *See*—
Melling, Richard; Nobbs, Arthur J.; and Leff, Andrew, 4,124,733, Cl. 428-212.000.
Leger, Andre: *See*—
Jeanmart, Claude; and Leger, Andre, 4,124,711, Cl. 424-250.000.
Leger, Lubert J., to United States of America, National Aeronautics and Space Administration. Thermal insulation attaching means. 4,124,732, Cl. 428-77.000.
Leggett & Platt, Incorporated: *See*—
Higgins, Larry, 4,124,041, Cl. 140-3.0CA.
Lehmann, Hans W.; and Widmer, Roland W., to RCA Corporation. Fabrication of multi-level relief patterns in a substrate. 4,124,473, Cl. 204-192.00E.
Lehmann, Rolf, to Escher Wyss Limited. Rolling mill with two press gaps. 4,124,349, Cl. 425-367.000.
Lehnen, Josef: *See*—
Koch, Heinrich; and Lehnen, Josef, 4,124,559, Cl. 260-33.6AQ.
Leigh Products, Inc.: *See*—
Malott, Richard C., 4,123,968, Cl. 98-43.00R.

Scott, Victor J., 4,123,874, Cl. 49-411.000.

Leisener, Kenneth P., to Caterpillar Tractor Co. Externally adjustable load plus pump control assembly. 4,124,333, Cl. 417-218.000.

Leitert, Frederick C.; and Vinson, Carl G., Jr., to Diamond Shamrock Corporation. High temperature chlorination catalyst. 4,124,534, Cl. 252-441.000.

Leitner, Gordon F.; Wiegratz, Fred G.; Cleaver, John C., deceased (by Cleaver, Harriet W. G., personal representative); by Cleaver, Laird C., personal representative; and by First Wisconsin Trust Company, to Water Services of America, Inc. Apparatus for cleaning heat exchanger tubes. 4,124,065, Cl. 165-95.000.

Leman, Bernard J. O., to Peignage Amedee. Process for the purification of greasy and soiled water using a heavy solvent, and apparatus for its implementation. 4,124,502, Cl. 210-21.000.

Lenke, Hans-Dieter: *See*—
Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, 4,124,716, Cl. 424-267.000.

Lentini, James J. Safe. 4,123,978, Cl. 109-51.000.

Leonard, John J.; and Kao, Jar-lin, to Atlantic Richfield Company. Tellurium catalyzed decomposition of peroxide intermediates resulting from the autoxidation of unsaturated aldehydes. 4,124,633, Cl. 562-598.000.

Leonard, John J.: *See*—
Kao, Jar-lin; and Leonard, John J., 4,124,635, Cl. 562-533.000.

Leone, Miguel A.; and Castellani, Americo, to Leone, Miguel A. Lubricant seals. 4,124,220, Cl. 277-162.000.

Levenson, Tony: *See*—
Frazier, Richard V., Jr.; and Levenson, Tony, 4,124,850, Cl. 343-7.300.

Lever Brothers Company: *See*—
Alterman, David S.; and Chun, Kil W., 4,124,734, Cl. 428-403.000.

Levi Strauss & Co.: *See*—
Johnson, Gerald L.; Huff, Joe T.; and Sanders, Weldon A., Jr., 4,124,285, Cl. 353-28.000.

Levie, Michael M.: *See*—
Johnson, Gary D.; Levie, Michael M.; Freese, Donald R.; Lee, Robert W.; and Paufve, Eldred H., 4,124,887, Cl. 364-107.000.

Lewis, Keith, to Lucas Industries Limited. Electrical switch. 4,124,791, Cl. 200-159.00R.

LGZ Landis & Gyr Zug AG: *See*—
Petr, Jan, 4,124,821, Cl. 328-151.000.

LiCalsi, Joseph, to American District Telegraph Company. Fire protection calculator. 4,124,795, Cl. 235-70.00A.

Lieb, Donald F.; and Sugano, Thomas T., to Diamond Shamrock Corporation. Controlling silica sol particle size. 4,124,471, Cl. 204-180.00P.

Lilley, John, to Lucas Industries Limited. Lamp reflectors. 4,124,883, Cl. 362-350.000.

Lim-Holding S.A.: *See*—
Grunner, Erich; and Schaller, Ewald, 4,124,345, Cl. 425-183.000.

Lin, Sing H.; and Yeh, Yu S., to Bell Telephone Laboratories, Incorporated. Arrangement for monitoring signal-to-interference ratio in a radio transmission system. 4,124,818, Cl. 325-363.000.

Lindberg, Bernt J.: *See*—
Rothman, Ulf S. E.; and Lindberg, Bernt J., 4,124,705, Cl. 424-180.000.

Linde Aktiengesellschaft: *See*—
Becker, Rudolf, 4,124,069, Cl. 165-164.000.

Lindemann Maschinenfabrik GmbH: *See*—
Quante, Siegfried, 4,123,970, Cl. 100-45.000.

Linder, Francis X.: *See*—
Clark, Robert V.; Linder, Francis X.; and Taylor, William R., 4,124,848, Cl. 340-524.000.

Lindholm, Robert D.: *See*—
Adin, Anthony; Huttemann, Thomas J.; and Lindholm, Robert D., 4,124,392, Cl. 96-77.000.

Lindmayer, Joseph. Method of making solar cell with multiple-metal contacts. 4,124,455, Cl. 204-38.00B.

Lindstrom, John W.: *See*—
Pettis, Charles R., Jr.; Del Rosso, Victor; and Lindstrom, John W., 4,124,436, Cl. 156-542.000.

Litton Systems, Inc.: *See*—
Maughmer, Robert W., 4,123,849, Cl. 33-320.000.

Lizotte, Robert H., to Cincinnati Milacron-Heald Corp. Grinding machine. 4,123,878, Cl. 51-165.870.

Lo, Allen K. W.; and Nims, Jerry C., to Dimensional Development Corp. Control of depth of field in three dimensional photography. 4,124,291, Cl. 355-22.000.

Locker, Peter, to Automatik Apparate-Maschinenbau H. Hench Gesellschaft mit beschraenkter Haftung. Apparatus for cooling and granulating strands of thermoplastic material. 4,124,341, Cl. 425-136.000.

Lodge & Shipley Company, The: *See*—
Trees, Carl I., 4,124,113, Cl. 198-476.000.

Loeb, Arnold. Wind driven energy system. 4,124,182, Cl. 244-153.00R.

Lohmann, Dieter; Furrer, Peter; Darms, Roland; and Greber, Gerd, to Ciba-Geigy Corporation. Process for the production of polyamide-polyamide-acid copolymers. 4,124,651, Cl. 260-857.0PA.

Lollar, Elizabeth D.: *See*—
Confalone, Pasquale N.; Lollar, Elizabeth D.; Pizzolato, Giacomo; and Uskokovic, Milan R., 4,124,595, Cl. 260-332.20A.

Longaker, Charles F.: *See*—
Armington, Raymond Q.; Atwater, Wayne G.; and Longaker, Charles F., 4,124,123, Cl. 211-186.000.

Longo, John M.: *See*—
Horowitz, Harold S.; Longo, John M.; and Haberman, Joel I., 4,124,539, Cl. 252-518.000.

Lorenz, Gunter: *See*—
Pieper, Christian; Uhlemann, Hans; Feltgen, Karlheinz; Nickel, Klaus; Nogaj, Alfred; and Lorenz, Gunter, 4,124,674, Cl. 264-233.000.

Losel, Georg: *See*—
Gersch, Karl H.; and Losel, Georg, 4,123,994, Cl. 122-6.00A.

Loss, Alan M.: *See*—
Samuel, Alan J.; Loss, Alan M.; and Cremer, Hans H., 4,124,001, Cl. 123-41.120.

Loutfy, Raouf O.; and Bharucha, Nanabhai R., to Noranda Mines Limited. Electrowinning of copper in presence of high concentration of iron. 4,124,460, Cl. 204-108.000.

Lozada, Vicente M.; Walther, William D.; and Welp, Lawrence J., to Dayton-Walther Corporation. Sandshoe. 4,124,225, Cl. 280-763.000.

Lubbock, Frederick J.: *See*—
Gillan, John; and Lubbock, Frederick J., 4,124,548, Cl. 260-17.00R.

Lucas G. S.A.: *See*—
Lucas, Gustave, 4,124,166, Cl. 239-662.000.

Lucas, Gustave, to Lucas G. S.A. Spreading tank. 4,124,166, Cl. 239-662.000.

Lucas Industries Limited: *See*—
Hill, William F.; and Jukes, Norman A., 4,124,009, Cl. 123-148.00E.
Lewis, Keith, 4,124,791, Cl. 200-159.00R.
Lilley, John, 4,124,883, Cl. 362-350.000.

Lucke, Florian, to Croon & Lucke Maschinenfabrik GmbH & Co., KG. Contractable winding mandrel. 4,124,171, Cl. 242-2.000.

Ludwig, Bernard J.: *See*—
Reisner, David B.; Ludwig, Bernard J.; Fukui, George M.; and Berger, Frank M., 4,124,723, Cl. 424-311.000.

Lukacs, Peter: *See*—
Anka, Mihaly; Lukacs, Peter; Gallo, Dezso; Szabics, Jozsef; and Szalay, Geza, 4,124,416, Cl. 148-13.000.

Lumpkin, Richard C.: *See*—
Sung, Benjamin T.; and Lumpkin, Richard C., 4,124,121, Cl. 209-583.000.

Lundberg, Knut A. L., to Stal Refrigeration AB. Connecting device for intermittent air flow. 4,124,046, Cl. 141-287.000.

Lunney, Elizabeth A.: *See*—
Tinney, Francis J.; Lunney, Elizabeth A.; and Nicolaides, Ernest D., 4,124,577, Cl. 260-112.5LH.

Lupo, Peter J. Fingernail cleaning apparatus. 4,123,816, Cl. 15-21.00D.

Lurssen, Klaus: *See*—
Kramer, Wolfgang; Draber, Wilfried; Buchel, Karl H.; Brandes, Wilhelm; and Lurssen, Klaus, 4,124,369, Cl. 71-76.000.

Lutz, Albert W.; and Diehl, Robert E., to America Cyanamid Company. N-alkoxyalkyl-2,6-dinitroaniline herbicides. 4,124,639, Cl. 260-573.000.

Lyapunov, Mikhail I.: *See*—
Yagupolsky, Lev M.; Zavatsky, Vladimir N.; Semeny, Valery Y.; Bildinov, Konstantin N.; Serebrov, Petr V.; Goncharenko, Alevtina A.; Kirsanov, Alexandr V.; Lyapunov, Mikhail I.; and Feschenko, Ninel G., 4,124,456, Cl. 204-59.00R.

M&T Chemicals Inc.: *See*—
Dworkin, Robert D.; and Ejk, Adam J., 4,124,618, Cl. 260-410.600.

Mabile, Michel: *See*—
Bonnet, Yves; and Mabile, Michel, 4,124,067, Cl. 165-107.00D.

MacDonald, James E., to Pennsylvania Coke Technology, Inc. Method for producing coke. 4,124,450, Cl. 201-15.000.

MacFarland, David R.: *See*—
Preston, Frank J.; and MacFarland, David R., 4,124,574, Cl. 528-76.000.

Machacek, Jiri: *See*—
Casensky, Bohuslav; Machacek, Jiri; Kriz, Otomar; and Kubanek, Vladimir, 4,124,584, Cl. 260-239.30R.

Machen, James F. Hinge-foot for folding frame. 4,124,188, Cl. 248-188.600.

Maeda, Chiaki: *See*—
Hisamoto, Iwao; Maeda, Chiaki; Deguchi, Takayuki; Omure, Yukio; and Onishi, Takasi, 4,124,517, Cl. 252-89.0DC.

Maeda, Naoyuki: *See*—
Abe, Michio; and Maeda, Naoyuki, 4,124,003, Cl. 123-119.00E.

Maehara, Toshifumi, to Akebono Brake Industry Company, Ltd. Audible alarm sounding type pad clip device for disc brake. 4,124,105, Cl. 188-1.00A.

Magavero, Carl A. Plumber's handle pulling tool. 4,123,838, Cl. 29-261.000.

Magnusson, Alan B.: *See*—
Dieck, Ronald L.; and Magnusson, Alan B., 4,124,567, Cl. 528-168.000.

Mahoney, John F.: *See*—
Cook, Leslie J.; Forrester, Alvin T.; Mahoney, John F.; Perel, Julius; and Vickers, Kenneth E., 4,124,801, Cl. 250-288.000.

Maier, Dale E.: *See*—
Hill, Ernest W.; Maier, Dale E.; and Humphrey, Melvin R., 4,123,930, Cl. 72-466.000.

Maja-Maschinenfabrik Hermann Schill GmbH: *See*—
Schill, Hermann, 4,123,959, Cl. 83-874.000.

Majewski, Helmut W.: *See*—
Blanch, Julian E.; and Majewski, Helmut W., 4,124,459, Cl. 204-99.000.

Makaeff, John: *See*—
Patel, Pravin K.; Johnston, David H.; and Makaeff, John, 4,124,736, Cl. 428-622.000.

Makino, Tetsuo: *See*—
Oguma, Tomio; Kawai, Shinji; Minamoto, Naoki; Yamaguchi, Yuji; and Makino, Tetsuo, 4,123,807, Cl. 4-7.000.

Makinson, Charles L.; Sutter, Kenneth C.; and Tyson, David Z., to Goodyear Tire & Rubber Company, The. Injection molding divers articles in selectably ordered sequence. 4,124,343, Cl. 425-145.000.

Makowski, Henryk: *See—*
Kurdowski, Wieslaw; Makowski, Henryk; Sobczuk, Roman; Szczepanik, Zenobiusz; Jochelson, Albert; Chomicki, Leszek; Thiel, Aleksandra; Jochelson, Aleksander; and Krupa, Zygmunt, 4,124,378, Cl. 75-10.00R.

Malissin, Roland; and Roullet, Gerald, to Thomson-Brandt. Head control means for optical videodisc player. 4,124,868, Cl. 358-128.000.

Malott, Richard C., to Leigh Products, Inc. Power vent. 4,123,968, Cl. 98-43.00R.

Mammel, A. Dean: *See—*
Rogers, Phillip W., 4,124,036, Cl. 137-375.000.

Mann, John J. Tool for use in making hooked rugs. 4,124,153, Cl. 223-102.000.

Mannesmann Aktiengesellschaft: *See—*
Gruner, Hans; Schrewe, Hans; Keuper, Erich; and Pleschhutschnigg, Fritz-Peter, 4,124,515, Cl. 252-62.000.

Manning, Lindley: *See—*
Case, James E.; Ruppert, Richard L.; and Manning, Lindley, 4,123,882, Cl. 52-125.000.

Mansfield, William R. Fixed metered orifice device for PCV systems of internal combustion engines. 4,124,007, Cl. 123-119.00B.

Mao, Chung-Ling, to Uniroyal, Inc. Thermoplastic polyurethane elastomer. 4,124,572, Cl. 528-76.000.

Maples, Crill; Schafer, Howard C.; and Ulrich, Richard D., to United States of America, Navy. Thermal standard. 4,123,939, Cl. 73-190.00H.

Marason, Gabriel, Jr.; and Collins, Harold B., to Mattel, Inc. Inertial phonograph device. 4,124,215, Cl. 274-1.00A.

Marcuse, Dietrich; and Presby, Herman M., to Bell Telephone Laboratories, Incorporated. Method for monitoring the concentricity of plastic coatings on optical fibers. 4,124,728, Cl. 427-8.000.

Margerum, Edwin O.: *See—*
Cowan, Everett C., Jr.; and Margerum, Edwin O., 4,124,032, Cl. 130-27.00T.

Maringer, Albert, to Siemens Aktiengesellschaft. Testing method for a reciprocating internal combustion engine. 4,123,935, Cl. 73-116.000.

Maringer, Robert E., to Battelle Development Corporation. Formation of filaments directly from an unconfined source of molten material. 4,124,664, Cl. 264-8.000.

Marks, Gerald R.: *See—*
Tokawa, Daniel T.; Mentz, Bernardus J.; Eng, Jeffrey D.; Cook, Edward H., Jr.; and Marks, Gerald R., 4,124,477, Cl. 204-252.000.

Marlow, Glenn. Mitering device for rectangular picture frames. 4,123,955, Cl. 83-435.100.

Marom, Emanuel: *See—*
Grinberg, Jan; and Marom, Emanuel, 4,124,278, Cl. 350-342.000.

Marra, Dorothea C.: *See—*
Spitzer, Joseph G.; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,124,149, Cl. 222-402.190.

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Martan, Michael; and Engel, Dusan J., to UOP Inc. Preparation of 3-fluorosalicylaldehyde. 4,124,643, Cl. 260-600.00R.

Martin, Eugene C.; and Adicoff, Arnold, to United States of America, Navy. Room temperature cured elastomer. 4,124,657, Cl. 260-879.000.

Martin, Jerry R.; and Tadanier, John S., to Abbott Laboratories. 3-de-O-Methylfortimicins. 4,124,756, Cl. 536-17.000.

Martin, Joseph M., to NRM Corporation. Post cure inflator. 4,124,337, Cl. 425-28.00P.

Martin Marietta Corporation: *See—*
Stang, Donald A., 4,124,277, Cl. 350-310.000.

Martin, Willie E., to E-Systems, Inc. Compensation system for a magnetic compass. 4,124,897, Cl. 364-571.000.

Marvin Glass & Associates: *See—*
Breslow, Jeffrey D.; Spinello, John O.; and Jaworski, Eugene, 4,124,207, Cl. 273-1.00R.

Masaki, Kenji; and Suzuki, Suzuo, to Nissan Motor Company, Limited. Air-fuel ratio control system for an internal combustion engine with a thermal reactor. 4,123,901, Cl. 60-277.000.

Masano, John T.: *See—*
Barge, Timothy T., 4,124,077, Cl. 169-70.000.

Masano, Thomas J.: *See—*
Barge, Timothy T., 4,124,077, Cl. 169-70.000.

Maschinefabrik Koppern GmbH & Co KG: *See—*
Bergendahl, Hans-Georg, 4,123,971, Cl. 100-93.0RP.

Maschinenfabrik Rissen GmbH: *See—*
Wommelsdorf, Fritz; and Schmidt, Werner, 4,124,434, Cl. 156-475.000.

Mashevich, Pavel R.: *See—*
Vasenkov, Alexandr A.; Dshkhunian, Valery L.; Mashevich, Pavel R.; Nesterov, Petr V.; Telenkov, Vyacheslav V.; Chicherin, Jury E.; and Juditsky, Davlet I., 4,124,890, Cl. 364-200.000.

Masnik, Walter. Ram pump flowmeter. 4,123,941, Cl. 73-205.00D.

Mason, Donald R., to Harris Corporation. Positively biased substrate IC with thermal oxide guard ring. 4,124,863, Cl. 357-54.000.

Mason, Herbert B. Golf putting practice apparatus. 4,124,210, Cl. 273-176.00F.

Mathai, John; and Druetzler, Thomas W., to Sherwin-Williams Company, The. Aliphatic hydrocarbon solvent reducible acrylic enamel of improved quality. 4,124,551, Cl. 260-23.0AR.

Matsuda, Yoshio; and Murasaki, Ryuichi, to Yoshida Kogyo K.K. Slide fastener stringer. 4,123,830, Cl. 24-205.16R.

Matsudaira, Takeshi: *See—*
Takise, Tadashi; Sekiguchi, Keisuke; and Matsudaira, Takeshi, 4,124,895, Cl. 364-514.000.

Matsui, Sadayoshi: *See—*
Shinohara, Akira; Akiyama, Kazuhito; Miki, Akira; and Matsui, Sadayoshi, 4,124,640, Cl. 260-575.000.

Matsuoka, Fumio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Seat belt system. 4,124,224, Cl. 280-745.000.

Matsuoka, Masafumi: *See—*
Saito, Taiji; and Matsuoka, Masafumi, 4,124,011, Cl. 123-195.00C.

Matsushita Electric Industrial Company, Limited: *See—*
Nishijyo, Masaru, 4,124,332, Cl. 417-26.000.

Mattel, Inc.: *See—*
Marason, Gabriel, Jr.; and Collins, Harold B., 4,124,215, Cl. 274-1.00A.

Mattern, Konrad, to Ekono Oy. Method of and apparatus for improving the heat exchange in natural-circulation and flow-through evaporators. 4,124,438, Cl. 159-47.00R.

Matula, Donald P.: *See—*
Peak, William H., 4,123,936, Cl. 73-149.000.

Maubon, Andre: *See—*
Antoine, Lucien; Maubon, Andre; and Largeron, Gerard, 4,124,200, Cl. 266-158.000.

Maughmer, Robert W., to Litton Systems, Inc. Miniature north reference unit. 4,123,849, Cl. 33-320.000.

Mawatari, Katsuhiko: *See—*
Terasawa, Mititaka; Mawatari, Katsuhiko; and Morimiya, Osamu, 4,124,802, Cl. 250-492.00A.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Danielmeyer, Hans-Gunter; Jeser, Jean-Pierre; Kruhler, Walter W.; Schonherr, Erich; and Huber, Gunter, 4,124,524, Cl. 252-301.10R.

Maximovich, Michael J.: *See—*
Gross, Bill B.; and Maximovich, Michael J., 4,124,555, Cl. 260-29.6HN.

May, Henri B.: *See—*
Allart, Pierre J.; and May, Henri B., 4,124,526, Cl. 252-316.000.

Mayer, William J. Motorcycle seat. 4,124,248, Cl. 297-204.000.

Mazzetti, Flavio J. Diaphragm pump. 4,124,334, Cl. 417-480.000.

Mazzetti, Flavio J. Reciprocating vacuum filter. 4,124,507, Cl. 210-141.000.

MCA Disco-Vision, Inc.: *See—*
Jarsen, Manfred H., 4,124,672, Cl. 264-129.000.

McCabe, Edward G., Jr. Liquid absorbing sectional pack. 4,124,116, Cl. 206-204.000.

McCanse, James E., to Hesston Corporation. Tractor mounted scraper blade. 4,124,080, Cl. 172-447.000.

McConway & Torley Corporation: *See—*
Oshinsky, Frank W., 4,124,057, Cl. 164-249.000.

McElroy, Arthur H.: *See—*
LaSpisa, Ronald J.; and McElroy, Arthur H., 4,124,340, Cl. 425-135.000.

McFadden, Arthur R.; and Aultz, Daniel E., to American Hoechst Corporation. Oxopyridobenzoxepin-acetic acids and derivatives thereof useful as antiinflammatory and analgesic agents. 4,124,713, Cl. 424-256.000.

McFarlane, Richard H. Process of insert molding of teflon tube and plastic body. 4,124,675, Cl. 264-249.000.

McGinnis, Edgar L.: *See—*
Carr, Norman L.; and McGinnis, Edgar L., 4,124,485, Cl. 208-8.000.

McGraw-Edison Company: *See—*
Kumbera, David G.; and Bordak, John A., 4,124,790, Cl. 200-144.00B.

McLoughlin, Bernard J.; and Guildford, Allen J., to Imperial Chemical Industries Limited. Anorexiants. 4,124,709, Cl. 424-248.400.

McMurtry, Carl H.: *See—*
Coppola, John A.; Hailey, Laurence N.; and McMurtry, Carl H., 4,124,667, Cl. 264-29.500.

McNeil Corporation: *See—*
Rosin, George C.; and Kulon, Robert E., 4,124,133, Cl. 214-707.000.

McRobbie, Henry W., to Union Carbide Corporation. Serial adiabatic methanation and steam reforming. 4,124,628, Cl. 260-449.00M.

McVicker, Gary B., to Exxon Research & Engineering Co. Process for the preparation of ethers. 4,124,647, Cl. 568-671.000.

Mead, Donald C.; Kasdan, Harvey L.; and Dorrity, Jordan L., to Greenwood Mills, Inc. Method for automatic fabric inspection. 4,124,300, Cl. 356-429.000.

Mefed, Anatoly E.; and Atsarkin, Vadim A. Method of viewing nuclear magnetic resonance. 4,124,813, Cl. 324-0.50A.

Meier, Richard E.: *See—*
Scheibelhoffer, Anthony S.; and Meier, Richard E., 4,124,570, Cl. 528-273.000.

Meldrum, Charles R. Lightweight demountable dock assembly. 4,123,912, Cl. 405-220.000.

Melling, Richard; Nobbs, Arthur J.; and Leff, Andrew, to Pilkington Brothers Limited. Laminated glass units. 4,124,733, Cl. 428-212.000.

Mellon, Regis B., to Akzona Incorporated. Telephone toll restrictor. 4,124,781, Cl. 179-90.00D.
Meloy, Gilbert K.: *See—*
Farrington, Diane G.; and Meloy, Gilbert K., 4,124,535, Cl. 252-448.000.
Melton, Joseph E., to Melton Systems, Inc. Floor finish applicator. 4,124,315, Cl. 401-48.000.
Melton Systems, Inc.: *See—*
Melton, Joseph E., 4,124,315, Cl. 401-48.000.
Menschik, Judith: *See—*
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Mensink, K. A.; Wittkampf, F. H. M.; and Renirie, A. C. M., to Vitatron Medical B.V. Programmable pacer. 4,124,031, Cl. 128-419.0PG.
Mentz, Bernardus J.: *See—*
Tokawa, Daniel T.; Mentz, Bernardus J.; Eug, Jeffrey D.; Cook, Edward H., Jr.; and Marks, Gerald R., 4,124,477, Cl. 204-252.000.
Mercer, Frank B., to F.B. Mercer Limited. Apparatus for transversely stretching tubular materials. 4,124,350, Cl. 425-393.000.
Merck & Co., Inc.: *See—*
Lampson, George P.; Tytell, Alfred A.; Field, Arthur K.; and Hilleman, Maurice R., 4,124,702, Cl. 424-85.000.
Merrell Toraude et Compagnie: *See—*
Giroux, Eugene L.; Prakash, Nellikunja J.; and Schechter, Paul J., 4,124,718, Cl. 424-274.000.
Merten, Rudolf: *See—*
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Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, 4,124,568, Cl. 528-59.000.
Messenger, Joseph U., to Mobil Oil Corporation. Use of oil-wetting spacers in cementing against evaporites. 4,124,075, Cl. 166-293.000.
Messer Griesheim GmbH: *See—*
Hesse, Jurgen; and Schulzki, Dieter, 4,124,137, Cl. 220-86.00R.
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Braun, Karl; and Tussetschlager, Reinhold, 4,124,195, Cl. 251-333.000.
Mutsch, Adam; Petters, Claus; and Grawe, Helmut, 4,123,974, Cl. 102-13.000.
Messler, Frederick B.; and Neville, Donald, to Plastiglide Manufacturing Corporation. Tufting button with plastic collet. 4,123,825, Cl. 24-90.00B.
Metaframe Corporation: *See—*
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Metalworks Limited: *See—*
Dauth, Michael F., 4,124,317, Cl. 403-8.000.
Meuleman, Johannes; and Besselere, Jean-Pierre, to U.S. Philips Corporation. Method of providing a layer of solid material on a substrate in which liquid from which the solid material can be formed, is spread over the substrate surface. 4,124,411, Cl. 136-89.0TF.
Meyer, Glenn A.: *See—*
Fleischmann, Lewis; Meyer, Glenn A.; and Hittman, Fred, 4,124,023, Cl. 128-2.00A.
Meyer, Robert E.: *See—*
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Meyer, Roth & Pastor Maschinenfabrik GmbH: *See—*
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Meyerhoefer, Carl E.; and Meyerhoefer, Carl H., to Revlon, Inc. Temperature sensing device. 4,124,034, Cl. 132-33.00R.
Meyerhoefer, Carl H.: *See—*
Meyerhoefer, Carl E.; and Meyerhoefer, Carl H., 4,124,034, Cl. 132-33.00R.
Meyers, George L.; and Webb, Russell R., to American Can Company. Round tray. 4,124,160, Cl. 229-21.000.
Meyers, George L., to American Can Company. Carton closure with scored flaps. 4,124,161, Cl. 229-37.00R.
Mezrich, Reuben S.; and Robbins, Cheston W., to United States of America, Health, Education and Welfare. Portable ultrasonic measurement system. 4,123,944, Cl. 73-657.000.
Michael, Joseph; and Siringo, Louis R. Glove pockets. 4,123,804, Cl. 2-247.000.
Michel, Max; and Fort, Jean-Paul, to Rhone Progil. Alumina-based bodies with large pores, produced by agglomeration. 4,124,699, Cl. 423-628.000.
Micheron, Francois; and Huignard, Jean Pierre, to Thomson-CSF. Optical device for the storage and the selective erasure of information. 4,124,268, Cl. 350-3.630.
Micko, Eric S.: *See—*
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Mihirogi, Kiyoshi: *See—*
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Mijs, Willem J.; Dusseau, Charles H. V.; and Sinnige, Hermannus J. M., to Akzona Incorporated. Free radical initiators. 4,124,763, Cl. 544-219.000.
Miki, Akira: *See—*
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Miller, Donald A., to Breadco Services Limited. Ovens for baking bread and like products. 4,124,016, Cl. 126-21.00A.
Miller, James F. Apparatus for forming synthetic logs. 4,124,347, Cl. 425-208.000.
Miller, Kenneth L., to Du Pont de Nemours, E. I., and Company. Polymerization process with subsequent peptization. 4,124,754, Cl. 526-220.000.
Miller, Randall J. Insulated pipe anchor assembly. 4,124,040, Cl. 138-148.000.
Miller, Rodney: *See—*
Black, Ian A.; and Miller, Rodney, 4,124,886, Cl. 363-121.000.
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Miller, William R.; and Pryde, Everett H., to United States of America, Agriculture. Alkyl 9,9(10,10)-bis(acyloxymethyl)octadecanoates as primary plasticizers for polyvinylchloride. 4,124,558, Cl. 260-31.600.
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Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, to Argus Chemical Corporation. Synthetic resin stabilizer comprising a 2,2,6,6-tetramethylpiperidine-4-alcohol ester and an oligomeric carbonate. 4,124,564, Cl. 260-45.80N.
Minamoto, Naoki: *See—*
Oguma, Tomio; Kawai, Shinji; Minamoto, Naoki; Yamaguchi, Yuji; and Makino, Tetsuo, 4,123,807, Cl. 4-7.000.
Mines, Gordon L.; and Consiglio, Aldo J., to TRW Inc. Mounting clip for a connector. 4,124,267, Cl. 339-125.00R.
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Okano, Yukio; Nakamura, Akiyoshi; and Ogura, Toshinobu, 4,124,276, Cl. 350-188.000.
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Mirell, Stuart. Compton scatter scintillation camera system. 4,124,804, Cl. 250-358.00R.
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Mitchell, Forest R.; Robinson, Joseph D.; and Vogiatzis, John P., to Shell Oil Company. Method for determining residual oil saturation of a formation. 4,124,800, Cl. 250-260.000.
Mitchell, Rex C.; Friedman, Joseph; Holl, Richard J.; and Easton, Charles R., to Rockwell International Corporation. Thermal energy storage unit. 4,124,061, Cl. 165-1.000.
Mitchell, Robert D., to Combustion Engineering, Inc. Hot briquette press. 4,124,338, Cl. 425-78.000.
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Yui, Hiroshi; Hayama, Kazuhide; and Takahashi, Hiroshi, 4,124,562, Cl. 260-42.140.
Mixich, Georg; Thiele, Kurt; and Fischer, Johanna, to Siegfried A.G. Imidazolyl-oxime ethers having anti-mycotic and bactericidal activity. 4,124,767, Cl. 548-341.000.
Miyakawa, Hideaki: *See—*
Uchidoi, Masanori; Miyakawa, Hideaki; Aizawa, Hiroshi; Yamamichi, Masayoshi; Ohshima, Osamu; and Tunekawa, Tokuichi, 4,124,855, Cl. 354-24.000.
Miyake, Tetsuya; and Takeda, Kunihiko, to Asahi Kasei Kogyo Kabushiki Kaisha. Separation of xylenols from cresols with adsorbent. 4,124,770, Cl. 568-758.000.
Miyata, Shin; Morikawa, Takeji; Kawai, Yoshihisa; Yamamoto, Shunji; and Okada, Osamu, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 4,124,289, Cl. 355-14.000.
Miyatani, Kazuo; and Sato, Isao, to RCA Corporation. Grooved n-type TiO_2 semiconductor anode for a water photolysis apparatus. 4,124,464, Cl. 204-129.000.
Miyazaki, Joichi, to Kabushiki Kaisha Daini Seikosha. Gear train of quartz-crystal timepiece having analogue display. 4,123,895, Cl. 58-23.0BA.
Miyazaki, Shigeru: *See—*
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Mizusawa, Shinichiro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Silencer for an internal combustion engine. 4,124,091, Cl. 181-231.000.
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Johnson, David E., 4,124,336, Cl. 425-4.00C.
Messenger, Joseph U., 4,124,075, Cl. 166-293.000.
Stournas, Stamoulis; and Heiba, El-Ahmadi Ibrahim, 4,124,512, Cl. 252-8.55D.
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Modell, Michael, to Arthur D. Little, Inc. Process for regenerating adsorbents with supercritical fluids. 4,124,528, Cl. 252-411.00R.
Moe, Walter; and Wessels, John A., to Diker-Moe Associates. Treadle scooter. 4,124,222, Cl. 280-221.000.
Moeglich, Karl, to Innova, Inc. Mass-transfer membrane and processes using same. 4,124,458, Cl. 204-98.000.
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Mohney, Harold F.; Riggs, Darius O.; Schoch, Walter K.; and Sorbie, Thomas B., to Owens-Illinois, Inc. Odd-shaped container indexing starwheel. 4,124,112, Cl. 198-344.000.
Molitor, Victor D., to Stainless Equipment Company. Makeup air tempering for grease extraction ventilator. 4,124,021, Cl. 126-299.00E.
Mollon, Leslie, to Brooks & Perkins, Incorporated. Storage rack for fuel cell receiving shrouds. 4,124,445, Cl. 176-87.000.
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Monolithic Memories, Inc.: *See—*
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Bollinger, Frederic G.; D'Amico, John J.; and Hansen, Dale J., 4,124,375, Cl. 71-96.000.
Dixon, William D., 4,124,371, Cl. 71-87.000.
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Morgan, Albert W.; Schumacher, Ignatius; and Vanderlinde, William, 4,124,400, Cl. 106-15.0FP.
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Moore Business Forms, Inc.: *See—*
Ruus, Henn, 4,124,227, Cl. 282-27.500.
Waffner, William D., 4,124,156, Cl. 226-25.000.
Moore, George G. I., to Riker Laboratories, Inc. Anti-inflammatory method. 4,124,725, Cl. 424-330.000.
Morgan, Albert W.; Schumacher, Ignatius; and Vanderlinde, William, to Monsanto Company. Flame retardant polymer compositions. 4,124,400, Cl. 106-15.0FP.
Morgan, Charles L.: *See—*
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Mori, Hiromichi; and Ikeda, Yoshikazu, to Kokusai Denshin Denwa Co., Ltd. Signal exchange system in an integrated services digital network. 4,124,777, Cl. 179-15.0AS.
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Morikawa, Takeji: *See—*
Miyata, Shin; Morikawa, Takeji; Kawai, Yoshihisa; Yamamoto, Shunji; and Okada, Osamu, 4,124,289, Cl. 355-14.000.
Morimiya, Osamu: *See—*
Terasawa, Mititaka; Mawatari, Katsuhiko; and Morimiya, Osamu, 4,124,802, Cl. 250-492.00A.
Morita, Hideo, to Nissan Motor Company, Limited. Carburetor and method of operating same. 4,124,662, Cl. 261-41.00D.
Morrey, John R., to Battelle Memorial Institute. Enhancing chemical reactions. 4,124,466, Cl. 204-157.10R.
Morrin, Thomas H., II, to International Business Machines Corporation. Image data resolution change apparatus and process utilizing boundary compression coding of objects. 4,124,871, Cl. 358-287.000.
Morrison, Donald L., to Kaiser Aerospace & Electronics Corporation. Pressure-balanced fluid coupling. 4,124,228, Cl. 285-1.000.
Mortimer, James R.: *See—*
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Gray, W. Robert, Jr., 4,124,367, Cl. 65-104.000.
Morton, Douglas R., Jr., to Upjohn Company, The. 9β-PGD_2 compounds. 4,124,615, Cl. 280-408.000.
Morton-Norwich Products, Inc.: *See—*
Yu, Chia-Nien, 4,124,604, Cl. 260-347.700.
Mosely, John deS.: *See—*
Johnson, Keith O.; Blackmer, David E.; and Mosely, John deS., 4,124,784, Cl. 179-100.30R.
Mosher Doors, Inc.: *See—*
Aspenson, Gary Lee; and Andersen, James Holger, 4,124,055, Cl. 160-193.000.
Moss, Norman W. Conveyer system. 4,124,115, Cl. 198-630.000.
Moss, Norman W. Self-closing container outlet. 4,124,150, Cl. 222-494.000.
Motorola, Inc.: *See—*
Black, Stephen R.; and Gibbs, Gary A., 4,124,844, Cl. 340-347.0AD.
Kreinick, Stephen J.; Musa, Fuad H.; and Shaw, Pern, 4,124,824, Cl. 330-252.000.
Schoemer, Hans L., 4,124,879, Cl. 362-26.000.
Muck, Karl-Friedrich: *See—*
Fischer, Johann P.; Cavagna, Friedrich; Duch, Eduard; and Muck, Karl-Friedrich, 4,124,751, Cl. 526-82.000.
Muller, Friedhelm, to Siemens Aktiengesellschaft. Sample-injection device for process gas chromatography with capillary columns. 4,124,358, Cl. 55-67.000.
Muller, Hans, to GRAPHA-Holding AG. Apparatus for forming sheet material assemblages. 4,124,203, Cl. 270-55.000.
Munden, George. Process for treating caustic wash solutions. 4,124,504, Cl. 210-50.000.
Munter, Ernst A., to Northern Telecom Limited. Programmable clock. 4,124,898, Cl. 364-703.000.
Murasaki, Ryuichi: *See—*
Matsuda, Yoshio; and Murasaki, Ryuichi, 4,123,830, Cl. 24-205.16R.
Murer, Angelo; and Amadei, Ottavio, to Exxon Research & Engineering Co. Conductive polyolefin sheet element. 4,124,747, Cl. 429-210.000.
Murray, Orin L.; and Kriegesmann, Edwin P., to Barry-Wehmiller Company. Solar heat collecting, storing and utilizing apparatus. 4,124,018, Cl. 126-271.000.
Musa, Fuad H.: *See—*
Kreinick, Stephen J.; Musa, Fuad H.; and Shaw, Pern, 4,124,824, Cl. 330-252.000.
Muse, George B. Wall structure with insulated interfitting blocks. 4,123,881, Cl. 52-100.000.
Mutsch, Adam; Petters, Claus; and Grawe, Helmut, to Messerschmitt-Bolkow-Blohm GmbH. Ocean floor mine. 4,123,974, Cl. 102-13.000.
MX-Processer Reinhardt & Co. AB: *See—*
Reinhardt, Hans; Ottertun, Harald D.; and Andersson, Sven O. S., 4,124,462, Cl. 204-119.000.
Naarden International, N.V.: *See—*
Boelens, Harmannus; and Wobben, Hendrik J., 4,124,771, Cl. 568-817.000.
Nadella: *See—*
de Senneville, Bernard, 4,124,256, Cl. 308-174.000.
Nadelson, Jeffrey, to Sandoz, Inc. Substituted hydroxy pyridones. 4,124,714, Cl. 424-263.000.
Nagase, Tsuneyuki: *See—*
Fujimoto, Masanori; Tsuji, Kozo; and Nagase, Tsuneyuki, 4,124,748, Cl. 526-8.000.
Naito, Shotaro; Ibamoto, Masahiko; Kiwaki, Hisakatsu; and Onoda, Yoshimitsu, to Hitachi, Ltd. Braking control apparatus for an electric motor operated vehicle. 4,124,812, Cl. 318-371.000.
Nakakubo, Tamio: *See—*
Kajiya, Sadao; Atsumi, Tomiaki; Kuroda, Osamu; and Nakakubo, Tamio, 4,124,092, Cl. 181-265.000.
Nakamura, Akiyoshi: *See—*
Okano, Yukio; Nakamura, Akiyoshi; and Ogura, Toshinobu, 4,124,276, Cl. 350-188.000.
Nakamura, Shinji; and Mihirogi, Kiyoshi, to Japan Air Lines Company, Ltd. Attractive type electromagnet device for magnetic levitation running vehicles. 4,123,976, Cl. 104-148.0MS.
Nakamura, Yoshihiro. Light emission regulation device. 4,124,294, Cl. 355-68.000.
Nakao, Sho: *See—*
Ochiai, Takeji; and Nakao, Sho, 4,124,395, Cl. 96-87.00R.
Shinozaki, Fumiaki; Ikeda, Tomoaki; Washizawa, Yasuo; and Nakao, Sho, 4,124,516, Cl. 252-79.200.
Nakatani, Shuhichi, to Kubota Tekko Kabushiki Kaisha. Modular construction for prefabricated house. 4,123,884, Cl. 52-220.000.
Narasimhan, Mandayam J.; and Anderson, John A., to University of Minnesota, The Regents of the. Process for the large scale production of human growth hormone by serial secondary suspension culture. 4,124,448, Cl. 195-1.800.
Narwicz, Charles A.: *See—*
Bjelland, Ronald W.; Narwicz, Charles A.; and Hetmanski, Casimir, 4,124,136, Cl. 220-68.000.
Nash, Franklin R.: *See—*
Dixon, Richard W.; Koszi, Louis A.; and Nash, Franklin R., 4,124,826, Cl. 331-94.50H.
Nastrificio Eurotessile S.R.L.: *See—*
Pastorelli, Dante; and Saporiti, Giancarlo, 4,124,420, Cl. 156-88.000.
National Car Rental System, Inc.: *See—*
Covington, William P., 4,123,831, Cl. 27-2.000.
National Research Development Corporation: *See—*
Fleischmann, Martin; Goodridge, Francis; and King, Christopher J. H., 4,124,453, Cl. 204-1.00R.
Pocock, Sydney N., 4,124,301, Cl. 356-432.000.
National Semiconductor Corporation: *See—*
Shieu, Mark S. D.; Laugesen, Ronald C.; and Dobkin, Robert C., 4,124,808, Cl. 307-362.000.
National Starch and Chemical Corporation: *See—*
Georgoudis, Paul C., 4,124,571, Cl. 260-16.000.
Naylor, Thomas K., to American Optical Corporation. Isolation amplifier. 4,124,822, Cl. 330-10.000.
NCR Corporation: *See—*
Bentley, Frank A., 4,123,822, Cl. 16-128.00R.

Neff, Clarence H., to Felt Products Mfg. Co. Fixed point elastomeric bridge bearing and bridge assembly. 4,123,815, Cl. 14-16.100.
Nemec, Joseph F., Jr., to Federal, Inc. Punch-thru lock assembly. 4,123,925, Cl. 70-329.000.
Nemec, Pavel: *See*—
Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; Nemec, Pavel; Katzer, Josef; and Stastny, Karel, 4,124,544, Cl. 521-26.000.
Nemoto, Mitsuo, to Kabushiki Kaisha Audio-Technica. Phonographic pickup. 4,124,783, Cl. 179-100.41K.
Neoloy Products, Inc.: *See*—
Prosen, Emil M., 4,124,382, Cl. 75-172.00R.
Nesterov, Petr V.: *See*—
Vasenkov, Alexandr A.; Dahkhunian, Valery L.; Mashevich, Pavel R.; Nesterov, Petr V.; Telenkov, Vyacheslav V.; Chicherin, Jury E.; and Juditsky, Davlet I., 4,124,890, Cl. 364-200.000.
Neuber, Ralph E.; and Rehkopf, Charles H., to GTE Sylvania Incorporated. Process for high voltage conditioning cathode ray tubes. 4,124,263, Cl. 316-1.000.
Neville, Donald: *See*—
Messler, Frederick B.; and Neville, Donald, 4,123,825, Cl. 24-90.00B.
New England Nuclear Corporation: *See*—
Kauffman, Joel M., 4,124,527, Cl. 252-408.000.
Newby, Gordon L.: *See*—
Hutchison, Stanley O.; Anderson, Glenn W.; and Newby, Gordon L., 4,124,547, Cl. 260-5.000.
Newton, David F.: *See*—
Greenhalgh, Colin W.; Newton, David F.; Budziarek, Richard; and Clarke, Howard, 4,124,355, Cl. 8-2.50A.
Nickel, Klaus: *See*—
Pieper, Christian; Uhlemann, Hans; Feltgen, Karlheinz; Nickel, Klaus; Nogaj, Alfred; and Lorenz, Gunter, 4,124,674, Cl. 264-233.000.
Nicolaides, Ernest D.: *See*—
Tinney, Francis J.; Lunney, Elizabeth A.; and Nicolaides, Ernest D., 4,124,577, Cl. 260-112.5LH.
Niebrzydoski, John L., to ACF Industries, Incorporated. Fuel flow balancing apparatus. 4,124,661, Cl. 261-23.00A.
Niemela, W. Wally; and Lampinen, Earl J., to W. Wally Niemela, by said Earl J. Lampinen. Chain saw and work piece support apparatus. 4,123,957, Cl. 83-796.000.
Niems, Lee H. Apparatus for pyroprocessing and cooling particles. 4,123,850, Cl. 34-20.000.
Nims, Jerry C.: *See*—
Lo, Allen K. W.; and Nims, Jerry C., 4,124,291, Cl. 355-22.000.
Nippon Coinco Co. Ltd.: *See*—
Hayashi, Yukichi, 4,124,111, Cl. 194-102.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Ogita, Minoru, 4,124,780, Cl. 179-15.0BT.
Nippon Hanpu Kogyo Co., Ltd.: *See*—
Yamaguchi, Miyoichi, 4,124,049, Cl. 150-0.500.
Nippon Kayaku Kabushiki Kaisha: *See*—
Hayami, Hiroshi; and Shimizu, Hitoshi, 4,124,631, Cl. 260-465.00C.
Nippon Kokan Kabushiki Kaisha: *See*—
Suzuki, Gyoichi; Ando, Ryo; Koyama, Tatsuo; Kubodera, Shoji; and Kondo, Renichi, 4,124,404, Cl. 106-103.000.
Nippon Oil Co., Ltd.: *See*—
Kobayashi, Takashi; and Iwai, Sakuya, 4,124,550, Cl. 260-23.300.
Nippon Zeon Co., Ltd.: *See*—
Joh, Yasushi, 4,124,510, Cl. 210-321.00B.
Nippondenso Co., Ltd.: *See*—
Itoh, Yoshiharu; Iwatsuki, Makoto; Suzuki, Kazuhiro; and Seko, Tatuya, 4,123,835, Cl. 29-156.40R.
Nishijyo, Masaru, to Matsushita Electric Industrial Company, Limited. Automatically operative pumping equipment. 4,124,332, Cl. 417-26.000.
Nissan Motor Company, Ltd.: *See*—
Aoyama, Syunichi, 4,124,004, Cl. 123-119.00A.
Asano, Masaharu, 4,123,999, Cl. 123-32.0EE.
Ezure, Toshikazu, 4,124,095, Cl. 187-9.00R.
Fujii, Toshihiko, 4,124,421, Cl. 156-87.000.
Hayashi, Yoshimasa, 4,123,903, Cl. 60-277.000.
Iida, Hiroshi, 4,123,902, Cl. 60-282.000.
Kato, Shinichi; Watanabe, Kiyoto; and Otani, Shuichi, 4,124,264, Cl. 339-59.00M.
Masaki, Kenji; and Suzuki, Suzuo, 4,123,901, Cl. 60-277.000.
Morita, Hideo, 4,124,662, Cl. 261-41.00D.
Nobbs, Arthur J.: *See*—
Melling, Richard; Nobbs, Arthur J.; and Leff, Andrew, 4,124,733, Cl. 428-212.000.
Noble, Charles H. Method and apparatus for centrifugal casting. 4,124,056, Cl. 164-114.000.
Noble, Haven D. Apparatus for collecting solar energy. 4,124,020, Cl. 126-271.000.
Nocker, Rudolf, to Siemens Aktiengesellschaft. Information system having multiple access and decentralized exchange. 4,124,776, Cl. 179-15.0AL.
Noda, Yoichiro: *See*—
Kiyono, Hiroshi; Ishimoto, Akio; Noda, Yoichiro; and Yada, Kozo, 4,124,344, Cl. 425-174.400.
Nogaj, Alfred: *See*—
Pieper, Christian; Feltgen, Karlheinz; and Nogaj, Alfred, 4,124,673, Cl. 264-171.000.
Pieper, Christian; Uhlemann, Hans; Feltgen, Karlheinz; Nickel, Klaus; Nogaj, Alfred; and Lorenz, Gunter, 4,124,674, Cl. 264-233.000.
Noguchi, Sadao, to Mitsubishi Jukogyo Kabushiki Kaisha. Method and apparatus for bottling. 4,124,043, Cl. 141-6.000.
Nolex Corporation: *See*—
Buschor, Josef J., 4,123,966, Cl. 93-49.00R.
Nolley, John P., Jr., to UOP Inc. Conversion of asphaltene-containing charge stocks and product separation process. 4,124,486, Cl. 208-95.000.
Nomoto, Koki: *See*—
Onozuka, Mitsuo; Nomoto, Koki; and Endo, Kiichi, 4,124,563, Cl. 260-42.240.
Nonoyama, Takao; Harada, Toshiro; and Suzuki, Yukio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for introducing secondary air into an internal combustion engine. 4,123,904, Cl. 60-290.000.
Noranda Mines Limited: *See*—
Loutfy, Raouf O.; and Bharucha, Nanabhai R., 4,124,460, Cl. 204-108.000.
Nordbiom, George F.; Turillon, Pierre P.; Huston, Ernest L.; and Keresztes, Stephan L., to International Nickel Company, Inc., The. Bipolar electrode support structures. 4,124,746, Cl. 429-210.000.
Nordby, Craig J., to Westinghouse Electric Corp. Offset compensation for harmonic neutralized static AC generator. 4,124,885, Cl. 363-56.000.
Nordstrom, Arnold B., to Transequip Inc. Automobile carrier for use on air cargo pallets. 4,124,119, Cl. 206-335.000.
Normart, Martin. Game apparatus for backgammon for four players. 4,124,212, Cl. 273-248.000.
Norris, Alan H.: *See*—
Chambley, Phillip W.; and Norris, Alan H., 4,123,893, Cl. 57-204.000.
Northern Telecom Limited: *See*—
Munter, Ernst A., 4,124,898, Cl. 364-703.000.
Novosibirsky Institut Organicheskoi Khimii Sibirskogo Otdelenia Akademii Nauk SSSR: *See*—
Kuzmin, Sergei V., 4,124,302, Cl. 356-440.000.
NPI Corporation: *See*—
Curtis, Richard E.; Dench, Robert H.; and Dervin, Victor J., 4,123,917, Cl. 62-309.000.
Fehlhaber, Gustav James, 4,123,919, Cl. 62-503.000.
NRM Corporation: *See*—
Martin, Joseph M., 4,124,337, Cl. 425-28.00P.
Nudelman, Abraham; and Patchornik, Abraham, to Yeda Research and Development Co. Ltd. 7-[(substituted-thiomethyl)phenyl] acetamidocephalosporin derivatives. 4,124,761, Cl. 544-27.000.
Nugent, Edward L., to Becton, Dickinson and Company. Vented protective shield for capillary pipette. 4,124,044, Cl. 141-98.000.
Nukem GmbH: *See*—
Borner, Paul; and Isensee, Hans-Jorg, 4,124,525, Cl. 252-301.10W.
Numerical Control, Inc.: *See*—
Burns, Charles E., 4,124,208, Cl. 273-67.00A.
Nuss, Barry D.: *See*—
Russell, Robert J.; Young, William; and Nuss, Barry D., 4,123,890, Cl. 53-396.000.
N.V. Optische Industrie "De Oude Delft": *See*—
Beckmann, Leo H. J. F., 4,124,269, Cl. 350-6.800.
Nykopp, Erik A., to Oy Tampella AB. Sheet forming apparatus including edge seals for forming wires. 4,124,441, Cl. 162-301.000.
Ocampo, Don O.: *See*—
Schramer, Kurt M.; and Ocampo, Don O., 4,124,431, Cl. 156-309.000.
Ocean Water Limited: *See*—
Wilson, Leslie P. S., 4,124,488, Cl. 210-134.000.
Ochiai, Takeji; and Nakao, Sho, to Fuji Photo Film Co., Ltd. Subbing layer on polyester film for light-sensitive material. 4,124,395, Cl. 96-87.00R.
O'Clair, Chester R.: *See*—
Greskovich, Charles D.; and O'Clair, Chester R., 4,124,402, Cl. 106-73.500.
Greskovich, Charles D.; Prochazka, Svante; and O'Clair, Chester R., 4,124,403, Cl. 106-73.500.
Offermanns, Heribert; Schwarze, Werner; and Vanheertum, Rudolf. Process for the production of chloromethyl thiocyanate. 4,124,630, Cl. 260-454.000.
Ogawa, Hiroshi: *See*—
Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, 4,124,296, Cl. 355-75.000.
Ogawa, Junkiti; and Shimamura, Isao, to Fuji Photo Film Co., Ltd. Process for processing color photographic material. 4,124,391, Cl. 96-66.500.
Ogita, Minoru, to Nippon Gakki Seizo Kabushiki Kaisha. FM stereophonic receiver providing a test signal. 4,124,780, Cl. 179-15.0BT.
Oguma, Tomio; Kawai, Shinji; Minamoto, Naoki; Yamaguchi, Yuji; and Makino, Tetsuo, to Aisin Seiki Kabushiki Kaisha. Retractable bidet. 4,123,807, Cl. 4-7.000.
Ogura, Toshinobu: *See*—
Okano, Yukio; Nakamura, Akiyoshi; and Ogura, Toshinobu, 4,124,276, Cl. 350-188.000.
Ohki, Ryoichi: *See*—
Sano, Motohiro; and Ohki, Ryoichi, 4,123,897, Cl. 58-59.000.
O'Horo, Michael P., to Xerox Corporation. Magnetic glass carrier materials. 4,124,385, Cl. 96-1.0SD.
O'Horo, Michael P., to Xerox Corporation. Magnetic glass carrier materials. 4,124,735, Cl. 428-406.000.

Ohshima, Osamu: *See*—
Uchidoi, Masanori; Miyakawa, Hideaki; Aizawa, Hiroshi; Yamamichi, Masayoshi; Ohshima, Osamu; and Tunekawa, Tokuichi, 4,124,855, Cl. 354-24.000.

Ohtsuki, Osamu: *See*—
Chibata, Ichiro; Sumi, Akihiko; and Ohtsuki, Osamu, 4,124,636, Cl. 562-402.000.

Okada, Osamu: *See*—
Miyata, Shin; Morikawa, Takeji; Kawai, Yoshihisa; Yamamoto, Shunji; and Okada, Osamu, 4,124,289, Cl. 355-14.000.

Okano, Yukio; Nakamura, Akiyoshi; and Ogura, Toshinobu, to Minolta Camera Kabushiki Kaisha. Soft focus lens system. 4,124,276, Cl. 350-188.000.

Okubo Haguruma Kogyo Kabushiki Kaisha: *See*—
Suganuma, Koichi, 4,124,304, Cl. 366-60.000.

Olavesen, Christopher; Sankey, Bruce M.; and Gilbert, John B., to Exxon Research & Engineering Co. Process for the production of low pour point synthetic oils. 4,124,650, Cl. 260-676.00R.

Olin Corporation: *See*—
Preston, Frank J.; and MacFarland, David R., 4,124,574, Cl. 528-76.000.

Oliver, Pamela D.: *See*—
Henderson, James A.; and Oliver, Pamela D., 4,124,272, Cl. 350-96.210.

Olivier, Charles A.; Panneton, Jean J.; and Perusse, Jacques, to Ministere des Richesses Naturelles, Gouvernement du Quebec. Continuous production of lithium carbonate. 4,124,684, Cl. 423-179.500.

Oltmans, Frank: *See*—
Bosselaar, Hendrik; and Oltmans, Frank, 4,123,847, Cl. 33-178.00E.

Olympus Optical Co., Ltd.: *See*—
Satoh, Ken; and Yanagida, Tuneo, 4,124,873, Cl. 360-74.000.

O'Mahoney, Joseph F., Jr., to Goodyear Tire & Rubber Company, The. Green strength of synthetic elastomers. 4,124,750, Cl. 526-20.000.

Omure, Yukio: *See*—
Hisamoto, Iwao; Maeda, Chiaki; Deguchi, Takayuki; Omure, Yukio; and Onishi, Takasi, 4,124,517, Cl. 252-89.0DC.

Onishi, Takasi: *See*—
Hisamoto, Iwao; Maeda, Chiaki; Deguchi, Takayuki; Omure, Yukio; and Onishi, Takasi, 4,124,517, Cl. 252-89.0DC.

Onizawa, Masao, to Sanyo Trading Co., Ltd. Curable composition containing fluorine rubbers and amino acids. 4,124,575, Cl. 526-18.000.

Ono Pharmaceutical Co., Ltd.: *See*—
Kurono, Masayasu; Chiba, Takeshi; and Fujii, Setsuro, 4,124,765, Cl. 544-313.000.

Onoda, Yoshimitsu: *See*—
Naito, Shotaro; Ibamoto, Masahiko; Kiwaki, Hisakatsu; and Onoda, Yoshimitsu, 4,124,812, Cl. 318-371.000.

Onozuka, Mitsuo; Nomoto, Koki; and Endo, Kiichi, to Kureha Kagaku Kogyo Kubushiki Kaisha. Stretched molding composed of calcium sulfite-containing polyethylene composition and a process for the preparation thereof. 4,124,563, Cl. 260-42.240.

Oosterwijk, Hendrik H. J., to Akzona Incorporated. Process for the preparation of SBR-rubbers employing bis(1-hydroperoxy cyclohexyl)peroxide. 4,124,752, Cl. 526-94.000.

Oppenhuizen, Simon W.: *See*—
Blodee, Leif; Knapp, Robert L.; and Oppenhuizen, Simon W., 4,123,879, Cl. 52-36.000.

Optron, Inc.: *See*—
Johnson, Herman D., 4,124,860, Cl. 357-19.000.

Oropallo, Robert A., to American Brass & Aluminum Foundry Co., Inc. Drain and removable gooseneck structure. 4,123,810, Cl. 4-288.000.

O'Rourke, James L. Toothbrush with dentifrice attachment. 4,124,316, Cl. 401-184.000.

O'Russa, Lorence. Fish stringer. 4,124,154, Cl. 224-7.00E.

Osborn, Harland J., to Eastman Kodak Company. 2,5-Dicarbonylaminophenol dye-forming couplers. 4,124,396, Cl. 96-100.00R.

Osby, Varme AB: *See*—
Ek, Finn U., 4,123,995, Cl. 122-43.000.

Oshinsky, Frank W., to McConway & Torley Corporation. Coupler pattern for a railway vehicle. 4,124,057, Cl. 164-249.000.

Osipow, Lloyd I.: *See*—
Spitzer, Joseph G.; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,124,149, Cl. 222-402.190.

Oswald, Roger; and Agache, Georges, to Etablissement Public die: Agence Nationale de Valorisation de la Recherche. Motor adapted for fuel comprising a product different from mineral oil product. 4,123,997, Cl. 123-1.00A.

Otani, Shuichi: *See*—
Kato, Shinichi; Watanabe, Kiyoto; and Otani, Shuichi, 4,124,264, Cl. 339-59.00M.

Otis Elevator Company: *See*—
Doane, John Charles; and Bittar, Joseph, 4,124,102, Cl. 187-29.00R.

Otrhalek, Joseph V.; Ajluni, Raymond M.; and Gomes, Gilbert S., to BASF Wyandotte Corporation. Post phosphating inhibiting rinse. 4,124,414, Cl. 148-6.15R.

Ottertun, Harald D.: *See*—
Reinhardt, Hans; Ottertun, Harald D.; and Andersson, Sven O. S., 4,124,462, Cl. 204-119.000.

Otto, Paul R.; and Leang, William N., to Westinghouse Electric Corp. Elevator system. 4,124,103, Cl. 187-29.00R.

Owens-Illinois, Inc.: *See*—
Mohney, Harold F.; Riggs, Darius O.; Schoch, Walter K.; and Sorbie, Thomas B., 4,124,112, Cl. 198-344.000.

Owens, Kenneth F. Decorative splash rails for boats. 4,123,812, Cl. 9-1.100.

Oxy Dry International, Inc.: *See*—
Van Zantwyk, A. Conrad G., 4,124,875, Cl. 361-227.000.

Oy Tampella AB: *See*—
Nykopp, Erik A., 4,124,441, Cl. 162-301.000.

Ozawa, Toshihiro: *See*—
Saijo, Hiromu; Miyazaki, Shigeru; Kanazawa, Koichi; Tomura, Nobuhide; and Ozawa, Toshihiro, 4,124,677, Cl. 264-289.000.

Pacific Saw & Knife Company: *See*—
Walker, Robert L., 4,124,157, Cl. 228-49.000.
Wright, John H.; and Jacobsen, George H., 4,123,958, Cl. 83-837.000.

Pak, Petr M.: *See*—
Tsybulevsky, Albert M.; Danilushkina, Kapitolina P.; and Pak, Petr M., 4,124,487, Cl. 208-111.000.

Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., to Stauffer Chemical Company. Herbicidal antidote compositions with substituted oxazolidines and thiazolidines. 4,124,372, Cl. 71-88.000.

Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., to Stauffer Chemical Company. Herbicide compositions. 4,124,376, Cl. 71-118.000.

Palmaer, Tore G. Roof construction. 4,123,880, Cl. 52-73.000.

Panaro, Robert J., to Gould Inc. Capacitor fuse and method of manufacturing a part thereof. 4,124,837, Cl. 337-251.000.

Panneton, Jean J.: *See*—
Olivier, Charles A.; Panneton, Jean J.; and Perusse, Jacques, 4,124,684, Cl. 423-179.500.

Papanek, Miroslav: *See*—
Zizka, Jaroslav; Janousek, Karel; and Papanek, Miroslav, 4,124,033, Cl. 131-10.900.

Paraisten Kalkki Oy - Pargas Kolk Ab: *See*—
Kajava, Antero, 4,123,888, Cl. 52-726.000.

Parisien, Rudolph E. Corner fastener. 4,124,322, Cl. 403-295.000.

Parker-Hannifin Corporation: *See*—
Clark, James B., 4,124,234, Cl. 285-247.000.
Grahl, Darwin R.; and Haramoto, Cary, 4,124,235, Cl. 285-340.000.

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Parras, Manuel. Framing square guide. 4,123,846, Cl. 33-112.000.

Parton, Brian, to Imperial Chemical Industries Limited. Arylazohydroxy pyridone dyes containing a pyridinium group. 4,124,579, Cl. 260-156.000.

Pasch, Lambert M., to Uniroyal A. G. Device for removing molded material from multi-plate molds. 4,124,352, Cl. 425-556.000.

Pasich, Daniel D. Ski boot attachment for facilitating walking. 4,123,854, Cl. 36-7.500.

Pasqualucci, Carmine: *See*—
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,124,585, Cl. 260-239.30P.
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Patchornik, Abraham: *See*—
Haviv, Fortuna; and Patchornik, Abraham, 4,124,762, Cl. 544-28.000.
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Patel, Pravin K.; Johnston, David H.; and Makaeff, John, to Poly-Disc Systems, Inc. Surface protected magnetic recording members. 4,124,736, Cl. 428-622.000.

Paterson Candy International, Limited: *See*—
Stevenson, David G., 4,124,480, Cl. 204-268.000.

Paufve, Eldred H.: *See*—
Johnson, Gary D.; Levie, Michael M.; Freese, Donald R.; Lee, Robert W.; and Paufve, Eldred H., 4,124,887, Cl. 364-107.000.

Paul, Rolf; and Menschik, Judith, to American Cyanamid Company. Substituted 3-(4-imidazolylmethylene)carbazic and thiocarbazic acid esters. 4,124,766, Cl. 548-337.000.

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Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., 4,124,437, Cl. 156-640.000.

Paull, James B., to James B. Paull & Co., Inc. Collimating solar radiation collector. 4,124,017, Cl. 126-270.000.

Paulson, Arnold E.: *See*—
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Pauly, Peter D.: *See*—
Stone, Herman; and Pauly, Peter D., 4,124,518, Cl. 252-91.000.

Pavis, Jesse A. Method and apparatus for interpretive game. 4,124,214, Cl. 273-249.000.

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Peak, William H., to Matula, Donald P., a part interest. Volumeter device. 4,123,936, Cl. 73-149.000.

Pearson, Lonnie B. Show window animation. 4,123,865, Cl. 40-414.000.

Pearson, Thomas A.: *See*—
Huntsinger, Dean P.; and Pearson, Thomas A., 4,124,845, Cl. 340-347.0DA.
PEC-Engineering Societe Anonyme: *See*—
Quienot, Jean, 4,124,405, Cl. 106-111.000.
Peccoud, Louise: *See*—
Bomchil, Guillermo; Buiguez, Francois; Galzin, Sylvie; Monfret, Alain; and Peccoud, Louise, 4,124,474, Cl. 204-192.00R.
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Bock, Manfred; Pedain, Josef; Uerdingen, Walter; and Schonfelder, Manfred, 4,124,569, Cl. 528-61.000.
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Leman, Bernard J. O., 4,124,502, Cl. 210-21.000.
Penn, Alan W., to United Kingdom Atomic Energy Authority. Heart pacemakers. 4,124,029, Cl. 128-419.00P.
Penner, Benjamin L. Quick detachable hinging structure. 4,124,247, Cl. 296-100.000.
Pennings, Matheus D., to Sola Basic Industries, Inc. Magazine apparatus for semiconductor processing device. 4,124,132, Cl. 214-301.000.
Pennsylvania Coke Technology, Inc.: *See*—
MacDonald, James E., 4,124,450, Cl. 201-15.000.
Pere, Gerard, to Creusot-Loire. Apparatus for supporting and assisted guiding of a machining tool. 4,123,877, Cl. 51-165.900.
Perel, Julius: *See*—
Cook, Leslie J.; Forrester, Alvin T.; Mahoney, John F.; Perel, Julius; and Vickers, Kenneth E., 4,124,801, Cl. 250-288.000.
Perez, Arthur; and Bowman, Edward E., to Tyler Refrigeration Corporation. Energy saving change of phase refrigeration system. 4,123,914, Cl. 62-196.00B.
Permalock Company: *See*—
Abel, Martin L., 4,124,432, Cl. 156-435.000.
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Pesnelle, Pierre; and Teisseire, Paul J., to Societe Anonyme des Etablissements Roure-Bertrand Fils & Justin Dupont. Process for the preparation of norpatchoulenol and intermediates therefor. 4,124,648, Cl. 568-817.000.
Peters, Mark A.; and Kazel, William G., to Cyprus Metallurgical Processes Corporation. Recovery of silver from cuprous chloride solutions by amalgamation. 4,124,379, Cl. 75-118.00R.
Petersen, Donald H.; and Schwemer, Warren C., to Advanced Technology Center, Inc. Method of making a tungsten carbide body. 4,124,665, Cl. 264-28.000.
Petersen, Warren D., to Burd, Inc., Howell Division. Modular furniture construction. 4,124,251, Cl. 297-445.000.
Peterson, David C., to Upjohn Company, The. 12,13(E)-Didehydro-13,14-dihydro-PGD$_2$ compounds. 4,124,610, Cl. 260-408.000.
Peterson, David C., to Upjohn Company, The. 12,13(E)-didehydro-13,14-dihydro-PGD$_1$ compounds. 4,124,611, Cl. 260-408.000.
Peterson, David C., to Upjohn Company, The. 9-Deoxy-PGD$_2$ compounds. 4,124,612, Cl. 260-408.000.
Peterson, David C., to Upjohn Company, The. 9-Deoxy-PGD$_1$ compounds. 4,124,613, Cl. 260-408.000.
Peterson, David C., to Upjohn Company, The. 12,13(E)-didehydro-13,14-dihydro-9-deoxy-PGD$_2$ compounds. 4,124,614, Cl. 260-408.000.
Peterson, David C., to Upjohn Company, The. Cis-4,5-didehydro-9-deoxy-PGD$_1$ compounds. 4,124,620, Cl. 260-413.000.
Peterson, David C., to Upjohn Company, The. Cis-4,5-didehydro-12,13(e)-didehydro-13,14-dihydro-9-deoxy-PGD$_1$ compounds. 4,124,621, Cl. 260-413.000.
Peterson, David C., to Upjohn Company, The. Cis-4,5-didehydro-12,13(E)-didehydro-13,14-dihydro-9,10-didehydro-9-deoxy-PGD$_1$ compounds. 4,124,622, Cl. 260-413.000.
Peterson, David C., to Upjohn Company, The. Inter-oxa-12,13(E)-didehydro-13,14-dihydro-PGD$_1$ compounds. 4,124,623, Cl. 562-503.000.
Peterson, David C., to Upjohn Company, The. Inter-oxa-9-deoxy-PGD$_1$ compounds. 4,124,624, Cl. 562-503.000.
Peterson, David C., to Upjohn Company, The. Inter-oxa-12,13(E)-didehydro-13,14-dihydro-9-deoxy-PGD$_1$ compounds. 4,124,625, Cl. 562-503.000.
Peterson Electronic Die Co., Inc.: *See*—
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Peterson, Everett A., to Peterson Electronic Die Co., Inc. Electronic sealing apparatus. 4,124,430, Cl. 156-380.000.
Peterson, James O.: *See*—
Anello, Louis G.; Berenbaum, Morris B.; Peterson, James O.; Sukornick, Bernard; and Sogn, Allen W., 4,124,606, Cl. 260-370.000.
Peterson, Marcus L. Gas exhaust nipple for guns. 4,123,867, Cl. 42-83.000.
Petr, Jan, to LGZ Landis & Gyr Zug AG. Analog to frequency convertor. 4,124,821, Cl. 328-151.000.
Petri AG, Firma: *See*—
Zeller, Gregor, 4,123,948, Cl. 74-492.000.
Petrov, Vladimir A.: *See*—
Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.
Petters, Claus: *See*—
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Pettis, Charles R., Jr.; Del Rosso, Victor; and Lindstrom, John W., to Hi-Speed Checkweigher Co., Inc. Cylinder label applier. 4,124,436, Cl. 156-542.000.
Petzoldt, Karl: *See*—
Elger, Walter; and Petzoldt, Karl, 4,124,708, Cl. 424-243.000.
Pfizer Inc.: *See*—
Bright, Gene M., 4,124,755, Cl. 536-9.000.
Holland, Gerald F., 4,124,590, Cl. 546-221.000.
Pharmacia Aktiebolag: *See*—
Rothman, Ulf S. E.; and Lindberg, Bernt J., 4,124,705, Cl. 424-180.000.
Phillips, Frank T., to Harnischfeger Corporation. Electrohydraulic outrigger control system. 4,124,226, Cl. 280-765.000.
Phillips, Paul E.; and Vinson, John E. Grain dispensing arrangement. 4,124,108, Cl. 193-16.000.
Phillips Petroleum Company: *See*—
Fahey, Darryl R., 4,124,627, Cl. 260-439.00R.
LaSpisa, Ronald J.; and McElroy, Arthur H., 4,124,340, Cl. 425-135.000.
Wier, Donald R., 4,124,073, Cl. 166-272.000.
Phipps, Donald L., Jr.; and Wambach, Allen D., to General Electric Company. Reinforced thermoplastic polyester compositions having improved shatter resistance. 4,124,561, Cl. 260-40.00R.
Phrasor Technology Incorporated: *See*—
Cook, Leslie J.; Forrester, Alvin T.; Mahoney, John F.; Perel, Julius; and Vickers, Kenneth E., 4,124,801, Cl. 250-288.000.
Pieper, Christian; Feltgen, Karlheinz; and Nogaj, Alfred, to Bayer Aktiengesellschaft. Process for the production of bifilar acrylic fibres. 4,124,673, Cl. 264-171.000.
Pieper, Christian; Uhlemann, Hans; Feltgen, Karlheinz; Nickel, Klaus; Nogaj, Alfred; and Lorenz, Gunter, to Bayer Aktiengesellschaft. Process for removing residual solvent from dry-spun filaments. 4,124,674, Cl. 264-233.000.
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Monguzzi, Riccardo; and Pifferi, Giorgio, 4,124,594, Cl. 260-326.430.
Pilkington Brothers Limited: *See*—
Melling, Richard; Nobbs, Arthur J.; and Leff, Andrew, 4,124,733, Cl. 428-212.000.
Pincon, Andrew J. Method and apparatus for producing ozone. 4,124,467, Cl. 204-157.10R.
Pipes, Robert K.: *See*—
King, David W.; and Pipes, Robert K., 4,124,070, Cl. 166-255.000.
Pirinoli, Franco: *See*—
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Pistor, Wolfgang: *See*—
Abele, Werner; Pistor, Wolfgang; Schmidt, Manfred; Smith, Harry O.; and Spannhake, Nils, 4,124,397, Cl. 96-109.000.
Pitney-Bowes, Inc.: *See*—
Schubert, Keith E., 4,123,950, Cl. 74-625.000.
Sette, Paul R.; and Storace, Anthony, 4,124,083, Cl. 177-214.000.
Pizzolato, Giacomo: *See*—
Confalone, Pasquale N.; Lollar, Elizabeth D.; Pizzolato, Giacomo; and Uskokovic, Milan R., 4,124,595, Cl. 260-332.20A.
Plastiglide Manufacturing Corporation: *See*—
Messler, Frederick B.; and Neville, Donald, 4,123,825, Cl. 24-90.00B.
Pleschhutschnigg, Fritz-Peter: *See*—
Gruner, Hans; Schrewe, Hans; Keuper, Erich; and Pleschhutschnigg, Fritz-Peter, 4,124,515, Cl. 252-62.000.
Pocock, Sydney N., to National Research Development Corporation. Device for measuring light transmitted through a material. 4,124,301, Cl. 356-432.000.
Pogonowski, Ivo C., to Texaco Inc. Mechanisms for interconnecting two cylinders underground. 4,123,913, Cl. 405-244.000.
Pohanka, Robert C.: *See*—
Walker, Basil E.; Pohanka, Robert C.; and Rice, Roy W., 4,124,671, Cl. 264-85.000.
Pohl, Jorg: *See*—
Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, 4,124,716, Cl. 424-267.000.
Pohl, Walter J., to General Electric Company. Advancing apparatus for spine fin tubing. 4,124,125, Cl. 214-1.0BB.
Pohle, Hans: *See*—
Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, 4,124,716, Cl. 424-267.000.
Polaroid Corporation: *See*—
Bloom, Stanley M.; Borror, Alan L.; and Huyffer, Paul S., 4,124,592, Cl. 260-326.12R.
Bronstein-Bonte, Irena Y.; and Taylor, Lloyd D., 4,124,388, Cl. 96-29.00D.
Denk, Edward G., 4,124,383, Cl. 96-3.000.
Erlichman, Irving, 4,124,858, Cl. 354-200.000.
Land, Edwin H.; and Kinsman, Gordon F., 4,124,742, Cl. 429-122.000.
Tarr, Fred P., 4,124,856, Cl. 354-86.000.
Pollard, Roy E.: *See*—
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Poly-Disc Systems, Inc.: *See*—
Patel, Pravin K.; Johnston, David H.; and Makaeff, John, 4,124,736, Cl. 428-622.000.
Polytop Corporation: *See*—
Hazard, Robert E., 4,124,151, Cl. 222-498.000.

Pores, Edwin B.: *See—*
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Porta-Pro Incorporated: *See—*
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Porter, Marion G.: *See—*
Weller, Edward F., III; and Porter, Marion G., 4,124,891, Cl. 364-200.000.
Posega, Paul, Jr., to Borg-Warner Corporation. Torque converter assembly. 4,123,905, Cl. 60-361.000.
Post Office, The: *See—*
Webb, Roderick P.; and Hooper, Raymond C., 4,124,825, Cl. 330-279.000.
Potthast, Ruthard: *See—*
Horak, Otto; Alles, Hans-Ulrich; Horstmann, Walter; Hammerstrom, Knut; and Potthast, Ruthard, 4,124,505, Cl. 210-63.00R.
Powell, Kim; and Sussex, Fred S. Mobile home antifreezing system. 4,124,179, Cl. 237-28.000.
Pozuelo, Jose. Method of pharmacologically treating drug addiction with fusaric acid. 4,124,715, Cl. 424-266.000.
PPG Industries, Inc.: *See—*
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Gray, W. Robert, Jr., 4,124,367, Cl. 65-104.000.
Prain, Hunter D.: *See—*
Durant, Graham J.; Emmett, John C.; Ganellin, Charon R.; and Prain, Hunter D., 4,124,717, Cl. 424-270.000.
Prakash, Nellikunja J.: *See—*
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Prause, Siegfried: *See—*
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Precision Metalsmiths, Inc.: *See—*
Simmons, John H.; and Daugherty, Donald A., 4,123,876, Cl. 51-34.00D.
Preece, Graham M., to Haigh Engineering Company Limited, The. Pressure switch actuator. 4,124,789, Cl. 200-81.00R.
Preisinger, Carl M. Bag holder. 4,124,185, Cl. 248-98.000.
Presby, Herman M.: *See—*
Marcuse, Dietrich; and Presby, Herman M., 4,124,728, Cl. 427-8.000.
Pressac Limited: *See—*
Wagstaff, John B., 4,124,266, Cl. 339-97.00C.
Presto Lock Company, division of Walter Kiddie & Company, Inc.: *See—*
Bako, Lazlo, 4,123,923, Cl. 70-74.000.
Preston, Frank J.; and MacFarland, David R., to Olin Corporation. Poly (oxyalkylene) glycol based polyurethane with improved paint adhesion properties. 4,124,574, Cl. 528-76.000.
Preston, Harold, to Automated Components Inc. Method and apparatus for maintaining fabric folds and shapes during manufacture of a fabric product. 4,124,424, Cl. 156-155.000.
Price, Donald C. Water jump rope device. 4,124,206, Cl. 272-74.000.
Priese, Werner K.; Janquart, Jerry C.; and Stanley, Deryl B., to Hills-McCanna Company. Flexible diaphragm dispensing system for condiments. 4,124,147, Cl. 222-135.000.
Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; Nemec, Pavel; Katzer, Josef; and Stastny, Karel, to Ceskoslovenska komise pro atomovou energii. Method of producing an activated cation-retaining sorbent through formation of a microcrystalline precipitate which adheres in the pores and on the surface of the sorbent. 4,124,544, Cl. 521-26.000.
Prochazka, Svante: *See—*
Greskovich, Charles D.; Prochazka, Svante; and O'Clair, Chester R., 4,124,403, Cl. 106-73.500.
Procter, Brian J.: *See—*
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Produits Chimiques Ugine Kuhlmann: *See—*
Arghiropoulos, Basile; and Tignol, Adrien P. N., 4,124,500, Cl. 210-59.000.
Propst, Franklin M. Record/playback apparatus. 4,124,872, Cl. 360-72.000.
Prosen, Emil M., to Neoloy Products, Inc. Dental alloy for use in the adhesion of porcelain. 4,124,382, Cl. 75-172.00R.
Prudhon, Francois; and Scicluna, Augustin, to Rhone-Poulenc Industries. Method and apparatus for carrying out a reaction between streams of fluid. 4,124,353, Cl. 431-8.000.
Prugh, Tommy J.: *See—*
Adams, Albert A.; Balogh, Karoly G.; and Prugh, Tommy J., 4,124,128, Cl. 214-6.0DK.
Pryde, Everett H.: *See—*
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Przystal, Frederick S.: *See—*
Fung, David T.; Laberge, J. G. Jacques; and Przystal, Frederick S., 4,124,492, Cl. 208-180.000.
Puech, Claude: *See—*
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Pugh, Joan E. Portable changer-surface for infants. 4,123,809, Cl. 4-185.00B.
Pyke, Margaret Elizabeth: *See—*
Blue, Archie H., 4,124,463, Cl. 204-129.000.
Quante, Siegfried, to Lindemann Maschinenfabrik GmbH. Apparatus for filling containers with compacted refuse. 4,123,970, Cl. 100-45.000.
Quienot, Jean, to PEC-Engineering Societe Anonyme. Process for solidifying aqueous wastes and products thereof. 4,124,405, Cl. 106-111.000.
Quinn, Clayton B.; and Rock, John A., to General Electric Company. Thermoplastic molding composition. 4,124,652, Cl. 260-860.000.
Quinn, Edwin J.: *See—*
Dieck, Ronald L.; and Quinn, Edwin J., 4,124,557, Cl. 260-30.60R
R & I Patent Corporation: *See—*
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Radek, John R., to Ready Metal Manufacturing Company. Beverage straw dispenser. 4,124,144, Cl. 221-191.000.
Radke, Thomas M.: *See—*
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Raffin, Lucien A., to International Harvester Company. Hydraulic actuated grab bucket. 4,124,243, Cl. 294-70.000.
Raguin, Michel M.: *See—*
Joyce, Thomas F.; and Raguin, Michel M., 4,124,893, Cl. 364-200.000.
Ramer, James L. Apparatus for treating sewage. 4,124,481, Cl. 204-278.000.
Rapata, George M., to Illinois Tool Works Inc. Linkage quick-connect fastener. 4,124,320, Cl. 403-163.000.
Rapolthy, Egon. Electrolytic cell for the production of aluminium. 4,124,476, Cl. 204-243.00R.
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Rausch, Richard E., to UOP Inc. Hydrocarbon dehydrogenation method. 4,124,649, Cl. 260-666.00A.
Raytheon Company: *See—*
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RCA Corporation: *See—*
Bortfeld, David P.; Cohen, Roger W.; and de Wolf, David A., 4,124,810, Cl. 315-15.000.
Coleman, Clyde F., 4,124,866, Cl. 358-128.000.
Fuhrer, Jack S.; and Keizer, Eugene O., 4,124,867, Cl. 358-128.000.
Greenberg, Leon S., 4,124,864, Cl. 357-70.000.
Helm, James H., 4,124,118, Cl. 206-310.000.
Lehmann, Hans W.; and Widmer, Roland W., 4,124,473, Cl. 204-192.00E.
Miyatani, Kazuo; and Sato, Isao, 4,124,464, Cl. 204-129.000.
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Recognition Systems, Inc.: *See—*
Kohn, Victor E., 4,124,390, Cl. 96-57.000.
Redford, David A., to Texaco Exploration Canada Ltd. Viscous oil recovery method. 4,124,072, Cl. 166-270.000.
Reed Ltd.: *See—*
Bialski, Alexander; Gentile, Camillo; and Sepall, Ola, 4,124,168, Cl. 241-14.000.
Reed, Robert D.; Hart, Wallace F.; and Cegielski, John M., to John Zink Company. Particulate carbon disposal by combustion. 4,124,681, Cl. 423-210.000.
Reed, Russell, Jr.; Meyer, Robert E.; Shaw, Graham C.; and Cornia, Richard P., to Thiokol Corporation. Siloxane-coated ammonium perchlorate and propellant compositions made therewith. 4,124,418, Cl. 149-7.000.
Reedy, Charles E.; and Carlson, Edwin S., to ACF Industries, Incorporated. Bottom operable tank car valve assembly having shear plane. 4,124,193, Cl. 251-144.000.
Reese, Thomas J.; Mortimer, James R.; Tobin, Melvin W.; and Gray, W. Robert, Jr., to PPG Industries, Inc. Method of making bent laminated glass windshields with drilled apertures. 4,124,367, Cl. 65-104.000.
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Reiber, Albert H., to United States of America, Navy. Mechanical movements for coding machines. 4,124,311, Cl. 400-90.000.
Reid, Lloyd E., to Exxon Research & Engineering Co. Production of transformer oil feed stocks from waxy crudes. 4,124,489, Cl. 208-87.000.
Reid, Paul A., to Towmotor Corporation. Method for measuring axle deflection. 4,123,933, Cl. 73-855.000.
Reinhardt, Hans; Ottertun, Harald D.; and Andersson, Sven O. S., to MX-Processer Reinhardt & Co. AB. Recovering zinc from a material containing zinc and iron. 4,124,462, Cl. 204-119.000.
Reisner, David B.; Ludwig, Bernard J.; Fukui, George M.; and Berger, Frank M., to Carter-Wallace, Inc. Method for suppressing histamine release. 4,124,723, Cl. 424-311.000.
Ren, Chung-Li, to Bell Telephone Laboratories, Incorporated. Waveguide filter employing dielectric resonators. 4,124,830, Cl. 333-73.00W.
Renirie, A. C. M.: *See—*
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Res-Q-Devices, Inc.: *See—*
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Revell, Alan E., to American Air Filter Company, Inc. Sealing device for filter cells. 4,124,361, Cl. 55-493.000.

Revlon, Inc.: *See*—
Jedzinak, John E., 4,124,521, Cl. 252-127.000.
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Rexnord Inc.: *See*—
Smith, Larry C.; and Webers, Robert J., 4,123,947, Cl. 74-245.00P.
Reynolds, Charles B.; and Summers, Thomas O., to Charles B. Reynolds & Associates. Bounceless seismic wave generator. 4,124,090, Cl. 181-121.000.
Rhodes, Sammy J.: *See*—
Bianchetta, Donald L.; Freedy, Allan L.; and Rhodes, Sammy J., 4,123,907, Cl. 60-445.000.
Rhone-Poulenc Industries: *See*—
Fabre, Jean-Louis; Farge, Daniel; and James, Claude, 4,124,596, Cl. 260-332.20A.
Jeanmart, Claude; and Leger, Andre, 4,124,711, Cl. 424-250.000.
Prudhon, Francois; and Scicluna, Augustin, 4,124,353, Cl. 431-8.000.
Rhone Progil: *See*—
Michel, Max; and Fort, Jean-Paul, 4,124,699, Cl. 423-628.000.
Ribka, Joachim; and Rieper, Wolfgang, to Hoechst Aktiengesellschaft. Process for the purification of azo pigments by stirring an aqueous, alkaline suspension of crude pigment. 4,124,582, Cl. 260-208.000.
Rice, John H. Self priming siphon. 4,124,035, Cl. 137-128.000.
Rice, Roy W.: *See*—
Walker, Basil E.; Pohanka, Robert C.; and Rice, Roy W., 4,124,671, Cl. 264-85.000.
Richard-Allan Medical Industries, Inc.: *See*—
Rumer, David O., Jr., 4,123,840, Cl. 29-453.000.
Ricoh Company, Ltd.: *See*—
Kawamura, Atsushi; and Fukushima, Yoshio, 4,124,882, Cl. 362-300.000.
Riedl, Werner, to Varta Batterie Aktiengesellschaft. Seal construction for primary cells. 4,124,738, Cl. 429-56.000.
Riegert, Richard P. Process for the protection of wear surfaces. 4,124,472, Cl. 204-192.0EC.
Rieper, Wolfgang: *See*—
Ribka, Joachim; and Rieper, Wolfgang, 4,124,582, Cl. 260-208.000.
Riggs, Darius O.: *See*—
Mohney, Harold F.; Riggs, Darius O.; Schoch, Walter K.; and Sorbie, Thomas B., 4,124,112, Cl. 198-344.000.
Riker Laboratories, Inc.: *See*—
Moore, George G. I., 4,124,725, Cl. 424-330.000.
Scherrer, Robert A., 4,124,602, Cl. 260-346.220.
Scherrer, Robert A., 4,124,603, Cl. 260-346.220.
Scherrer, Robert A., 4,124,605, Cl. 260-346.220.
Scherrer, Robert A., 4,124,704, Cl. 424-180.000.
Rinehart, Dixie L., to Wells-Lamont Corporation. Thumb construction for a glove. 4,123,803, Cl. 2-163.000.
Ring, Charles E.: *See*—
Bond, Herbert M.; Ring, Charles E.; Edgar, John A.; Bennett, Ronald; Paul, Willis K.; and Harshbarger, Roland N., 4,124,437, Cl. 156-640.000.
Ritter, Arthur J., Jr.: *See*—
Durgan, Virgil R. C.; Harper, Robert W.; and Ritter, Arthur J., Jr., 4,123,906, Cl. 60-403.000.
Rivalto, Michael A. Fuel level responsive means. 4,124,013, Cl. 123-198.0DB.
Rivet, Huey J. Hydraulic control and drive system for amphibious vehicle having a topside dragline draw works thereon. 4,124,124, Cl. 212-69.000.
Rivetti, Enrico: *See*—
Bertone, Antonino; and Rivetti, Enrico, 4,123,908, Cl. 60-548.000.
Robbins, Cheston W.: *See*—
Mezrich, Reuben S.; and Robbins, Cheston W., 4,123,944, Cl. 73-657.000.
Robert Bosch GmbH: *See*—
Assenheimer, Jurgen; and Brettschneider, Johannes, 4,124,005, Cl. 123-119.0EC.
Heitmann, Jurgen, 4,124,869, Cl. 358-171.000.
Jons, Claus; Schonherr, Erich; and Wolff, Gunter, 4,124,335, Cl. 418-73.000.
Roberts, Herbert B. Tie tacks. 4,123,824, Cl. 24-49.0CP.
Roberts, Wallace A. Electro-therapeutic faradic current generator. 4,124,030, Cl. 128-422.000.
Robinson, Joseph D.: *See*—
Mitchell, Forest R.; Robinson, Joseph D.; and Vogiatzis, John P., 4,124,800, Cl. 250-260.000.
Rock, John A.: *See*—
Quinn, Clayton B.; and Rock, John A., 4,124,652, Cl. 260-860.000.
Rockland, Louis B.; and Radke, Thomas M., to United States of America, Agriculture. Nutritionally balanced protein snack food prepared from legume seeds. 4,124,727, Cl. 426-549.000.
Rockwell International Corporation: *See*—
Huntsinger, Dean P.; and Pearson, Thomas A., 4,124,845, Cl. 340-347.0DA.
Lauerman, Albert L., 4,124,814, Cl. 324-208.000.
Mitchell, Rex C.; Friedman, Joseph; Holl, Richard J.; and Easton, Charles R., 4,124,061, Cl. 165-1.000.
Roddy, Patrick; Downes, George W.; Searle, John V.; and Bregazzi, Terence W., to Ford Motor Company. Method and apparatus for nondestructive ultrasonic measuring of cast engine cylinder wall thickness. 4,123,943, Cl. 73-623.000.
Rodenkirch, Norman E., to Ford Motor Company. Engine emission control system. 4,124,006, Cl. 123-119.00A.
Rogers, Phillip W., to Mammel, A. Dean. Valve having ellipsoid valve member. 4,124,036, Cl. 137-375.000.
Roggo, Bernard, to Fives-Cail Babcock. Mold for continuous casting of molten metal. 4,124,059, Cl. 164-436.000.
Rohm and Haas Company: *See*—
Yu, Pyung K., 4,124,370, Cl. 71-78.000.
Rohrs, Donald L.; Collins, Donald L.; and Downing, Harold A., to Collins Industries, Inc. Safety barrier for a wheelchair lift. 4,124,130, Cl. 214-75.00R.
Romanov, Viktor I.; Kirzner, Felix I.; and Soroka, Yakov K. Axial-flow reversible turbine. 4,124,329, Cl. 415-85.000.
Romero, Anthony P. Non-ferrous pitchfork for use in silo. 4,124,241, Cl. 294-51.000.
Romey, Ingo: *See*—
Juntgen, Harald; Schumacher, Horst; Klein, Jurgen; Knoblauch, Karl; Schroter, Hans-Jurgen; Kolling, Georg; and Romey, Ingo, 4,124,529, Cl. 252-421.000.
Rontex America Inc.: *See*—
Dilo, Richard, 4,124,731, Cl. 428-36.000.
Rosai, Livio: *See*—
della Porta, Paolo; Giorgi, Tiziano A.; and Rosai, Livio, 4,124,659, Cl. 264-0.500.
Rosell, Axel: *See*—
Andersson, Lars O.; Isfalt, Engelbrekt; and Rosell, Axel, 4,124,062, Cl. 165-2.000.
Rosin, George C.; and Kulon, Robert E., to McNeil Corporation. Molten metal delivery carrier. 4,124,133, Cl. 214-707.000.
Rossetti, Vittorio: *See*—
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,124,585, Cl. 260-239.30P.
Marsili, Leonardo; Rossetti, Vittorio; and Pasqualucci, Carmine, 4,124,586, Cl. 260-239.30P.
Rothman, Ulf S. E.; and Lindberg, Bernt J., to Pharmacia Aktiebolag. Agent for intravascular administration. 4,124,705, Cl. 424-180.000.
Roullet, Gerald: *See*—
Malissin, Roland; and Roullet, Gerald, 4,124,868, Cl. 358-128.000.
Rubio, Diego C., Jr.; Bauer, Richard G.; and Scriver, Richard M., Jr., to Goodyear Tire & Rubber Company, The. Green strength of elastomers. 4,124,546, Cl. 260-5.000.
Rudy, Marion F. Apparatus for repressuring tennis and similar play balls. 4,124,117, Cl. 206-213.100.
Rumer, David O., Jr., to Richard-Allan Medical Industries, Inc. Package for blades or the like and a method of attaching same to the end of a handle. 4,123,840, Cl. 29-453.000.
Rumyantsev, Leonid A. Centrifugal governor. 4,123,942, Cl. 73-535.000.
Ruppert, Richard L.: *See*—
Case, James E.; Ruppert, Richard L.; and Manning, Lindley, 4,123,882, Cl. 52-125.000.
Russell, Robert E. Semi-cylindrical oscillating sifter. 4,124,498, Cl. 209-267.000.
Russell, Robert J.; Young, William; and Nuss, Barry D. Envelope opening apparatus and method. 4,123,890, Cl. 53-396.000.
Rusznyak, Andre, to Ebauches S.A. Electronic device for the production of signals of an amplitude greater than the amplitude of a given periodic signal. 4,124,806, Cl. 307-264.000.
Rutger Larson Konsult AB: *See*—
Larson, Ulf Rutger, 4,124,377, Cl. 75-0.50C.
Ruus, Henn, to Moore Business Forms, Inc. Oxime ethers of Michler's hydrol, method of producing same and pressure-sensitive recording systems containing such compounds. 4,124,227, Cl. 282-27.500.
Ryabov, Evgeny A.: *See*—
Serenkov, Vasily I.; Deev, Jury S.; Ryabov, Evgeny A.; Gorbunova, Elena V.; Tikhomirov, Vladimir S.; Dobrokhotova, Marina K.; and Berezovsky, Alexandr V., 4,124,468, Cl. 204-159.110.
Ryder International Corporation: *See*—
Thomas, Michael D., 4,124,143, Cl. 221-82.000.
Rye, Grover W.; and Bell, Richard L., to Goodyear Tire & Rubber Company, The. Method of maintaining tire cords in parallel array for calendering with elastomeric material. 4,124,425, Cl. 156-168.000.
Ryland, Lloyd B.: *See*—
Armstrong, Warren E.; Ryland, Lloyd B.; and Voge, Hervey H., 4,124,538, Cl. 252-466.0PT.
S.A.E.S. Getters S.p.A.: *See*—
della Porta, Paolo; Giorgi, Tiziano A.; and Rosai, Livio, 4,124,659, Cl. 264-0.500.
Saab-Scania Aktiebolag: *See*—
Gillbrand, Per S.; and Gadefelt, Bengt G., 4,123,996, Cl. 123-1.00R.
Sabacky, Milton J.: *See*—
Knowles, William S.; and Sabacky, Milton J., 4,124,533, Cl. 252-431.00P.
Sadowski, Alexander M. Coupling device. 4,123,900, Cl. 59-83.000.
Safir, Julian R. Back support with controllable firmness. 4,124,252, Cl. 297-452.000.
Saga, Katsumas: *See*—
Hamazaki, Yasuhiko; Kawabata, Shozo; Yamamoto, Toshiyuki; Shiraishi, Yasuo; Ueno, Akira; Amemiya, Koji; and Saga, Katsumas, 4,124,726, Cl. 424-331.000.
Sagady, Daniel V., to General Motors Corporation. Splined assembly with retaining rings. 4,124,318, Cl. 403-14.000.

Sagara, Seiji: *See—*
Kishi, Hirotoshi; Ariga, Masao; Hattori, Hiroyuki; Furukawa, Yoshiki; Ogawa, Hiroshi; Amanuma, Takahiko; Umezawa, Kazumi; and Sagara, Seiji, 4,124,296, Cl. 355-75.000.

Saggese, Edward J.: *See—*
Bilyk, Alexander; Saggese, Edward J.; and Monroe, Harry A., Jr., 4,124,609, Cl. 260-406.000.

Saijo, Hiromu; Miyazaki, Shigeru; Kanazawa, Koichi; Tomura, Nobuhide; and Ozawa, Toshihiro, to Toshiba Kikai Kabushiki Kaisha. Method of manufacturing polyvinyl alcohol films oriented in two orthogonal directions. 4,124,677, Cl. 264-289.000.

Saiki, Noritsugu; Kurisu, Shizuka; and Kawase, Shoji, to Teijin Limited. Process for preparing polyesters. 4,124,566, Cl. 528-177.000.

St. Laurent, Richard E. Pipe thawing machine. 4,124,039, Cl. 138-35.000.

Saito, Taiji; and Matsuoka, Masafumi, to Toyota Jidosha Kogyo Kabushiki Kaisha. System for preventing outflow of oil from an oil filler port. 4,124,011, Cl. 123-195.00C.

Sakanoue, Seiki: *See—*
Imai, Shinichi; and Sakanoue, Seiki, 4,124,393, Cl. 96-77.000.

Sakurada, Satoshi: *See—*
Itoh, Takuji; Sakurada, Satoshi; and Tagaya, Nobuaki, 4,124,536, Cl. 252-455.00R.

Saliba, William; and Hoefling, Juliana M. Protective device. 4,124,138, Cl. 220-90.200.

Samuel, Alan J.; Loss, Alan M.; and Cremer, Hans H., to FMC Corporation. Electronic speed control for a variable speed fan drive. 4,124,001, Cl. 123-41.120.

Sanders, Weldon A., Jr.: *See—*
Johnson, Gerald L.; Huff, Joe T.; and Sanders, Weldon A., Jr., 4,124,285, Cl. 353-28.000.

Sandhu, Surinder S.: *See—*
Wilhelm, Gerd; Jaschke, Artur; Simon, Hans-Jurgen; Schmidt, Jens; and Sandhu, Surinder S., 4,124,666, Cl. 264-39.000.

Sandoz, Inc.: *See—*
Hardtmann, Goetz E., 4,124,587, Cl. 546-90.000.
Hardtmann, Goetz E.; and Coppola, Gary M., 4,124,588, Cl. 546-21.000.
Nadelson, Jeffrey, 4,124,714, Cl. 424-263.000.

Sandoz Ltd.: *See—*
Berthold, Richard; and Troxler, Franz, 4,124,719, Cl. 424-274.000.
Stutz, Peter; and Stadler, Paul, 4,124,712, Cl. 424-250.000.

Sankey, Bruce M.: *See—*
Olavesen, Christopher; Sankey, Bruce M.; and Gilbert, John B., 4,124,650, Cl. 260-676.00R.

Sano, Motohiro; and Ohki, Ryoichi, to Kabushiki Kaisha Daini Seikosha. Second jumper spring. 4,123,897, Cl. 58-59.000.

Sanyo Trading Co., Ltd.: *See—*
Onizawa, Masao, 4,124,575, Cl. 526-18.000.

Saporiti, Giancarlo: *See—*
Pastorelli, Dante; and Saporiti, Giancarlo, 4,124,420, Cl. 156-88.000.

Sato, Isao: *See—*
Miyatani, Kazuo; and Sato, Isao, 4,124,464, Cl. 204-129.000.

Satoh, Ken; and Yanagida, Tuneo, to Olympus Optical Co., Ltd. Electric device for use in a transcriber. 4,124,873, Cl. 360-74.000.

Satoh, Tsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Elevator speed control apparatus. 4,124,101, Cl. 187-29.00R.

Saul, Franz J. Method and apparatus for producing a collapsibly foldable packaging sleeve having a polygonal cross-section. 4,124,426, Cl. 156-193.000.

Savas, Christy: *See—*
Gulla, Michael; and Savas, Christy, 4,124,399, Cl. 106-1.230.

Savin Business Machines Corporation: *See—*
Gardiner, Kenneth W., 4,124,295, Cl. 355-68.000.

Schafer, Howard C.: *See—*
Maples, Crill; Schafer, Howard C.; and Ulrich, Richard D., 4,123,939, Cl. 73-190.00H.

Schafer, Robert J.; and Toeniskoetter, Richard H., to Ashland Oil, Inc. Moulding composition containing (a) silane additive (b) iron oxide and (c) polyurethane resin and method for preparing shaped foundry products. 4,124,556, Cl. 260-29.15B.

Schaller, Ewald: *See—*
Grunner, Erich; and Schaller, Ewald, 4,124,345, Cl. 425-183.000.

Schaper, Ulf-Armin: *See—*
Conrad, Jens; Schaper, Ulf-Armin; and Bruns, Klaus, 4,124,541, Cl. 252-522.000.

Schatz, Bruce R.; and Wong, Kwan Y., to International Business Machines Corporation. Method for improving print quality of coarse-scan/fine-print character reproduction. 4,124,870, Cl. 358-260.000.

Schechter, Paul J.: *See—*
Giroux, Eugene L.; Prakash, Nellikunja J.; and Schechter, Paul J., 4,124,718, Cl. 424-274.000.

Scheffler, Gerhard: *See—*
Emig, Peter; Pohle, Hans; Scheffler, Gerhard; Brock, Norbert; Lenke, Hans-Dieter; and Pohl, Jorg, 4,124,716, Cl. 424-267.000.

Scheibelhoffer, Anthony S.; and Meier, Richard E., to Goodyear Tire & Rubber Company, The. Poly(neopentyl terephthalate/trimellitate)-thermosetting resin. 4,124,570, Cl. 528-273.000.

Scherf, Gerhard W. H., to Canadian D. A. Stuart Oil Co. Limited. Oxyethylated acetals. 4,124,641, Cl. 568-601.000.

Schering, A.G.: *See—*
Elger, Walter; and Petzoldt, Karl, 4,124,708, Cl. 424-243.000.

Schering Corporation: *See—*
Green, Michael J.; and Shue, Ho-Jane, 4,124,707, Cl. 424-241.000.

Scherrer, Robert A., to Riker Laboratories, Inc. Optionally sunbstituted 3-(cyanophenyl)benzofurans. 4,124,602, Cl. 260-346.220.

Scherrer, Robert A., to Riker Laboratories, Inc. 4-(or 5 or 6 or 7)cyano-2-nitro-3-phenylbenzofurans. 4,124,603, Cl. 260-346.220.

Scherrer, Robert A., to Riker Laboratories, Inc. 2-Nitro or 2-bromo-(3-cyanomethylphenyl)benzofurans. 4,124,605, Cl. 260-346.220.

Scherrer, Robert A., to Riker Laboratories, Inc. 2-Nitro-3-phenylbenzofuran alkanoic (or propenoic) acids. 4,124,704, Cl. 424-180.000.

Schill, Hermann, to Maja-Maschinenfabrik Hermann Schill GmbH. Slicing machine for bacon or the like. 4,123,959, Cl. 83-874.000.

Schill, John M., to Keystone Consolidated Industries, Inc. Hardware for pivoting cabinet shelf. 4,124,262, Cl. 312-305.000.

Schittenhelm, Rudolf, to Siemens Aktiengesellschaft. Arrangement for examining a body with ionizing radiation. 4,124,799, Cl. 250-252.000.

Schlage Lock Company: *See—*
Elder, George, 4,123,926, Cl. 70-369.000.

Schluderberg, Donald C.: *See—*
Jabsen, Felix S.; Schluderberg, Donald C.; and Paulson, Arnold E., 4,124,064, Cl. 165-69.000.

Schmidt-Hatting, Wolfgang; and Heinzmann, Ulrich, to Swiss Aluminium Ltd. Protecting tube. 4,124,465, Cl. 204-147.000.

Schmidt, Helmut; Strobel, Walter; Treude, Gunter; and Blaser, Paul, to Kienzle Apparate GmbH. Keyboard assembly. 4,124,313, Cl. 400-491.200.

Schmidt, Jens: *See—*
Wilhelm, Gerd; Jaschke, Artur; Simon, Hans-Jurgen; Schmidt, Jens; and Sandhu, Surinder S., 4,124,666, Cl. 264-39.000.

Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, to VEB Jenapharm. Process for making (DL) pantolactone. 4,124,597, Cl. 260-343.600.

Schmidt, Manfred: *See—*
Abele, Werner; Pistor, Wolfgang; Schmidt, Manfred; Smith, Harry O.; and Spannhake, Nils, 4,124,397, Cl. 96-109.000.

Schmidt, Werner: *See—*
Wommelsdorf, Fritz; and Schmidt, Werner, 4,124,434, Cl. 156-475.000.

Schmuck, Charles M., to Teledyne Industries, Inc. Discharge pusher assembly and drive of a rack-type dough proofer. 4,124,114, Cl. 198-482.000.

Schneider, George H.: *See—*
Armentrout, James L.; and Schneider, George H., 4,124,141, Cl. 220-306.000.

Schoch, Walter K.: *See—*
Mohney, Harold F.; Riggs, Darius O.; Schoch, Walter K.; and Sorbie, Thomas B., 4,124,112, Cl. 198-344.000.

Schoemer, Hans L., to Motorola, Inc. Illumination apparatus for use in an illuminatable pushbutton keyset and the like. 4,124,879, Cl. 362-26.000.

Scholer, Fred R.: *See—*
Blumbergs, John H.; and Scholer, Fred R., 4,124,356, Cl. 8-111.000.

Schon, Manfred, to AKG Akustische u. Kino-Gerate Gesellschaft m.b.H. Sound pickup having plastic enveloped pole plate to pole rod junction. 4,124,782, Cl. 179-100.41K.

Schonfelder, Manfred: *See—*
Bock, Manfred; Pedain, Josef; Uerdingen, Walter; and Schonfelder, Manfred, 4,124,569, Cl. 528-61.000.

Schonherr, Erich: *See—*
Danielmeyer, Hans-Gunter; Jeser, Jean-Pierre; Kruhler, Walter W.; Schonherr, Erich; and Huber, Gunter, 4,124,524, Cl. 252-301.10R.
Jons, Claus; Schonherr, Erich; and Wolff, Gunter, 4,124,335, Cl. 418-73.000.

Schorm, Erhard: *See—*
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,124,597, Cl. 260-343.600.

Schramer, Kurt M.; and Ocampo, Don O., to Stauffer Chemical Company. Dimensionally stable, calendered vinyl film. 4,124,431, Cl. 156-309.000.

Schrewe, Hans: *See—*
Gruner, Hans; Schrewe, Hans; Keuper, Erich; and Pleschhutschnigg, Fritz-Peter, 4,124,515, Cl. 252-62.000.

Schroter, Hans-Jurgen: *See—*
Juntgen, Harald; Schumacher, Horst; Klein, Jurgen; Knoblauch, Karl; Schroter, Hans-Jurgen; Kolling, Georg; and Romey, Ingo, 4,124,529, Cl. 252-421.000.

Schubert, Keith E., to Pitney-Bowes, Inc. Retro-fittable tape trip mechanism. 4,123,950, Cl. 74-625.000.

Schulin, Gotthilf: *See—*
Bauer, Peter; Dietzsch, Guenter; Landwehr, Goetz; and Schulin, Gotthilf, 4,123,843, Cl. 30-383.000.

Schultz, Frederick E., to General Electric Company. Method and device for orthogonally woven reinforcing structure. 4,123,832, Cl. 28-143.000.

Schulzki, Dieter: *See—*
Hesse, Jurgen; and Schulzki, Dieter, 4,124,137, Cl. 220-86.00R.

Schumacher, Erick, to Industrial Electronic Engineers, Inc. Multiple image projection device. 4,124,284, Cl. 353-25.000.

Schumacher, Horst: *See—*
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Schumacher, Ignatius: *See—*
Morgan, Albert W.; Schumacher, Ignatius; and Vanderlinde, William, 4,124,400, Cl. 106-15.0FP.

Schwab, Thomas L. Shroud for a submerged jet cutting nozzle. 4,124,162, Cl. 239-288.500.

Schwalley, Lawrence L.; and Ferm, Donald J., to United States Borax & Chemical Corp. Anti-microbial bathroom cleaning compositions containing o-benzyl-4-chlorophenol. 4,124,520, Cl. 252-106.000.

Schwarze, Werner: *See—*
Offermanns, Heribert; Schwarze, Werner; and Vanheertum, Rudolf, 4,124,630, Cl. 260-454.000.

Schwarzkopf, Robert W., to Weyerhaeuser Company. Container construction. 4,124,159, Cl. 229-17.00R.

Schwebel, Paul R.; and Friend, Manuel N. Disposable hypodermic injection ampule. 4,124,024, Cl. 128-173.00H.

Schwemer, Warren C.: *See—*
Petersen, Donald H.; and Schwemer, Warren C., 4,124,665, Cl. 264-28.000.

Scicluna, Augustin: *See—*
Prudhon, Francois; and Scicluna, Augustin, 4,124,353, Cl. 431-8.000.

Science Accessories Corporation: *See—*
Kiss, William, 4,124,838, Cl. 340-1.00R.

Scott, Harley D., to Cyclops Corporation. Building panel joint. 4,123,885, Cl. 52-483.000.

Scott, Victor J., to Leigh Products, Inc. By-pass door assembly. 4,123,874, Cl. 49-411.000.

Scotty Fabricators Inc.: *See—*
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Scriver, Richard M., Jr.: *See—*
Rubio, Diego C., Jr.; Bauer, Richard G.; and Scriver, Richard M., Jr., 4,124,546, Cl. 260-5.000.

Sealfon, Andrew I. Fluid metering device. 4,124,146, Cl. 222-70.000.

Searle, John V.: *See—*
Roddy, Patrick; Downes, George W.; Searle, John V.; and Bregazzi, Terence W., 4,123,943, Cl. 73-623.000.

Sechi, Franco N., to RCA Corporation. Microwave coupler. 4,124,823, Cl. 330-56.000.

Seitetsu Kagaku Co., Ltd.: *See—*
Kawamura, Masao; Hatta, Masakazu; Koune, Nobuhiro; and Kitagishi, Nobuyuki, 4,124,646, Cl. 260-609.00E.

Sekiguchi, Keisuke: *See—*
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Sekisui Kagaku Kogyo Kabushiki Kaisha: *See—*
Kiyono, Hiroshi; Ishimoto, Akio; Noda, Yoichiro; and Yada, Kozo, 4,124,344, Cl. 425-174.400.

Seko, Tatuya: *See—*
Itoh, Yoshiharu; Iwatsuki, Makoto; Suzuki, Kazuhiro; and Seko, Tatuya, 4,123,835, Cl. 29-156.40R.

Semeny, Valery Y.: *See—*
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Sener, Tecnica Industrial y Naval, S.A.: *See—*
de Francisco-Sainz, Jose-Luis, 4,124,446, Cl. 176-87.000.

Sepall, Ola: *See—*
Bialski, Alexander; Gentile, Camillo; and Sepall, Ola, 4,124,168, Cl. 241-14.000.

Sera, Hidefumi; Tsubota, Motohiko; and Hanai, Sosuke, to Fuji Photo Film Co., Ltd. Color diffusion transfer photographic materials with sulfone color developing agent scavengers. 4,124,394, Cl. 96-77.000.

Serebrov, Petr V.: *See—*
Yagupolsky, Lev M.; Zavatsky, Vladimir N.; Semeny, Valery Y.; Bildinov, Konstantin N.; Serebrov, Petr V.; Goncharenko, Alevtina A.; Kirsanov, Alexandr V.; Lyapunov, Mikhail I.; and Feschenko, Ninel G., 4,124,456, Cl. 204-59.00R.

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Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.

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Seretny, Stanley E.; and Webb, Carl E., to Bell Telephone Laboratories, Incorporated. Telephone set. 4,124,785, Cl. 179-103.000.

Sette, Paul R.; and Storace, Anthony, to Pitney-Bowes, Inc. Automatic analytical weighing scale. 4,124,083, Cl. 177-214.000.

Seven, Manfred K.: *See—*
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Herzl, Peter J.; and Shaffer, Robert G., 4,123,940, Cl. 73-194.0VS.

Shang, Wai K. Electrolytic treatment of metal sheet. 4,124,454, Cl. 204-27.000.

Shanis, Arnold A. Air barrier device using pressurized swirls. 4,123,967, Cl. 98-36.000.

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Yano, Kozo; Inami, Yasuhiko; Hamada, Hiroshi; and Uede, Hisashi, 4,123,841, Cl. 29-570.000.

Shaw, Graham C.: *See—*
Reed, Russell, Jr.; Meyer, Robert E.; Shaw, Graham C.; and Cornia, Richard P., 4,124,418, Cl. 149-7.000.

Shaw, Pern: *See—*
Kreinick, Stephen J.; Musa, Fuad H.; and Shaw, Pern, 4,124,824, Cl. 330-252.000.

Shell Oil Company: *See—*
Armstrong, Warren E.; Ryland, Lloyd B.; and Voge, Hervey H., 4,124,538, Cl. 252-466.0PT.
Bosselaar, Hendrik; and Oltmans, Frank, 4,123,847, Cl. 33-178.00E.
Mitchell, Forest R.; Robinson, Joseph D.; and Vogiatzis, John P., 4,124,800, Cl. 250-260.000.

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Hearst, John E.; Rapoport, Henry; Isaacs, Stephen; and Shen, Che-Kun J., 4,124,598, Cl. 260-343.210.

Sherman, Michael I., to Kamyr Inc. Chip bin steam distributor with a vibrating discharge. 4,124,440, Cl. 162-246.000.

Sherwin, Amos G. Developer composition and process for penetrant inspection. 4,124,484, Cl. 252-301.190.

Sherwin-Williams Company, The: *See—*
Mathai, John; and Druetzler, Thomas W., 4,124,551, Cl. 260-23.0AR.

Shibata, Toshihiro: *See—*
Minagawa, Motonobu; Kubota, Naohiro; and Shibata, Toshihiro, 4,124,564, Cl. 260-45.80N.

Shibazaki, Hiroji; Edagawa, Setsuji; Hasegawa, Hisashi; and Kondo, Satoshi, to Shiraishi Kogyo Kaisha, Ltd. Process for preparing cubic crystals of calcium carbonate. 4,124,688, Cl. 423-432.000.

Shieu, Mark S. D.; Laugesen, Ronald C.; and Dobkin, Robert C., to National Semiconductor Corporation. MOS on-chip voltage sense amplifier circuit. 4,124,808, Cl. 307-362.000.

Shigeru, Yasuo; and Kurosu, Tomio, to Copal Company Limited. Fade-in and fade-out device of an automatic servomechanism of diaphragm in a cinecamera. 4,124,283, Cl. 352-91.00C.

Shimamura, Isao: *See—*
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Shimano Industrial Company Limited: *See—*
Kine, Masayoshi, 4,124,107, Cl. 192-64.000.

Shimizu, Gen: *See—*
Itoh, Kinya; Tanaka, Shigeaki; Shimizu, Gen; and Suganuma, Yuzi, 4,123,851, Cl. 34-48.000.

Shimizu, Hitoshi: *See—*
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Shingo Kizai Kabushiki Kaisha: *See—*
Kobayashi, Kunimitsu, 4,124,840, Cl. 340-501.000.

Shinohara, Akira; Akiyama, Kazuhito; Miki, Akira; and Matsui, Sadayoshi, to Ihara Chemical Industry Co., Ltd. Process for producing alkoxyanilines. 4,124,640, Cl. 260-575.000.

Shinozaki, Fumiaki; Ikeda, Tomoaki; Washizawa, Yasuo; and Nakao, Sho, to Fuji Photo Film Co., Ltd. Dot-etching solution. 4,124,516, Cl. 252-79.200.

Shipley Company Inc.: *See—*
Gulla, Michael; and Savas, Christy, 4,124,399, Cl. 106-1.230.

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Shibazaki, Hiroji; Edagawa, Setsuji; Hasegawa, Hisashi; and Kondo, Satoshi, 4,124,688, Cl. 423-432.000.

Shiraishi, Yasuo: *See—*
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Shores, Marvin W., to General Dynamics Corporation. Emission control calculator. 4,124,796, Cl. 235-88.00R.

Shropshire, Joseph A.; and Eustace, Daniel J., to Exxon Research & Engineering Co. Recovery, manipulation and storage of bromine. 4,124,693, Cl. 423-503.000.

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Tsien, Hsue C.; Shropshire, Joseph A.; and Venero, Agustin F., 4,124,478, Cl. 204-255.000.

Shue, Ho-Jane: *See—*
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Siegmann, Carl, to Heinrich Buhnen KG, Firma. Relief pressure valve for hot melt adhesive. 4,124,163, Cl. 239-533.150.

Siegwart, Emil. Fluid flow regulator. 4,124,037, Cl. 137-499.000.

Siemens Aktiengesellschaft: *See—*
Aigner, Georg, 4,124,832, Cl. 335-128.000.
Kattner, Erich; and Kindler, Wilfried, 4,124,853, Cl. 346-140.00R.
Kuenemund, Friedrich, 4,124,829, Cl. 333-71.000.
Maringer, Albert, 4,123,935, Cl. 73-116.000.
Muller, Friedhelm, 4,124,358, Cl. 55-67.000.
Nocker, Rudolf, 4,124,776, Cl. 179-15.0AL.
Schittenhelm, Rudolf, 4,124,799, Cl. 250-252.000.

Siempelkamp Giesserei KG: *See—*
Gross, Heiko, 4,124,447, Cl. 176-87.000.

Silva, Teiko. Toy animal figures. 4,123,872, Cl. 46-123.000.

Simmons, John H.; and Daugherty, Donald A., to Precision Metalsmiths, Inc. Casting cut-off machine. 4,123,876, Cl. 51-34.00D.

Simon, Hans-Jurgen: *See—*
Wilhelm, Gerd; Jaschke, Artur; Simon, Hans-Jurgen; Schmidt, Jens; and Sandhu, Surinder S., 4,124,666, Cl. 264-39.000.

Singer Company, The: *See—*
Brown, Jack, 4,123,981, Cl. 112-158.00E.
Coulombe, Lionel J., 4,123,984, Cl. 112-254.000.
Transue, James A., 4,123,983, Cl. 112-221.000.

Singerle, Richard C.; and Denman, Gail M., to Res-Q-Devices, Inc. Signal balloon device. 4,123,987, Cl. 116-124.00B.

Sinnige, Hermannus J. M.: *See—*
Mijs, Willem J.; Dusseau, Charles H. V.; and Sinnige, Hermannus J. M., 4,124,763, Cl. 544-219.000.

Sipler Plastics, Inc.: *See—*
Stroupe, James D., 4,124,678, Cl. 264-314.000.
Siringo, Louis R.: *See—*
Michael, Joseph; and Siringo, Louis R., 4,123,804, Cl. 2-247.000.
Sirot, Norbert; and Thevenon, Robert, to U.S. Philips Corporation. Method of diffusing impurities in semiconductor bodies. 4,124,417, Cl. 148-189.000.
Skapa, Miroslav: *See—*
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Skinner, David L.: *See—*
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Sklar, Steven D. Non-precious dental casting alloy. 4,124,381, Cl. 75-171.000.
Sloan Kettering Institute for Cancer Research: *See—*
Goldstein, Gideon, 4,124,700, Cl. 424-1.000.
Slywka, Michael, to Gibson-Homans Company, The. Container filling apparatus for viscous material. 4,124,045, Cl. 141-129.000.
Small, Marvin: *See—*
Spitzer, Joseph G.; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C., 4,124,149, Cl. 222-402.190.
Smith, Harry O.: *See—*
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Smith, Herman W., to Upjohn Company, The. Certain 5-halo-6,9α-epoxy-14-bromo(or chloro)-PGF_1 compounds. 4,124,601, Cl. 260-346.220.
Smith, Herman W., to Upjohn Company, The. Composition and process. 4,124,616, Cl. 260-408.000.
Smith, Herman W., to Upjohn Company, The. 5-Oxa-13,14-didehydro-11-deoxy-PGF_1α compounds. 4,124,769, Cl. 560-121.000.
Smith Kline & French Laboratories Limited: *See—*
Durant, Graham J.; Emmett, John C.; Ganellin, Charon R.; and Prain, Hunter D., 4,124,717, Cl. 424-270.000.
Smith, Larry C.; and Webers, Robert J., to Rexnord Inc. Non-metallic transmission chain. 4,123,947, Cl. 74-245.00P.
Smith, Oliver W.: *See—*
Koleske, Joseph V.; and Smith, Oliver W., 4,124,552, Cl. 260-29.2TN.
Smith, Philip C.; and Fagan, John L., to Westinghouse Electric Corp. Memory using interleaved rows to permit closer spacing. 4,124,900, Cl. 365-72.000.
SmithKline Corporation: *See—*
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Sobczuk, Roman: *See—*
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Societe Anonyme de Telecommunications: *See—*
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Societe Anonyme des Etablissements Roure-Bertrand Fils & Justin Dupont: *See—*
Pesnelle, Pierre; and Teisseire, Paul J., 4,124,648, Cl. 568-817.000.
Societe Anonyme dite: Laboratoire L. Lafon: *See—*
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Societe Anonyme dite l'Oreal: *See—*
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Societe Suisse pour l'Industrie Horlogere Management Services S.A.: *See—*
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Sogn, Allen W.: *See—*
Anello, Louis G.; Berenbaum, Morris B.; Peterson, James O.; Sukornick, Bernard; and Sogn, Allen W., 4,124,606, Cl. 260-370.000.
Sokolow, Nickolas N., to Beloit Corporation. Sequential co-injection unit adapted for structural foam molding. 4,124,308, Cl. 366-77.000.
Sola Basic Industries, Inc.: *See—*
Pennings, Matheus D., 4,124,132, Cl. 214-301.000.
Solid State Scientific Inc.: *See—*
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Sony Corporation: *See—*
Takise, Tadashi; Sekiguchi, Keisuke; and Matsudaira, Takeshi, 4,124,895, Cl. 364-514.000.
Sorbie, Thomas B.: *See—*
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Sorensen, N. Krebs, to Bang and Olufsen A/S. Phonograph. 4,124,216, Cl. 274-23.00A.
Soroka, Yakov K.: *See—*
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Spalding, Ronald P.: *See—*
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Spannhake, Nils: *See—*
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Sperry Rand Corporation: *See—*
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Cowan, Everett C., Jr.; and Margerum, Edwin O., 4,124,032, Cl. 130-27.00T.
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Spinner, Joseph R.; and Baker, Melvin A., to King-Seeley Thermos Co. Diverter valve assembly and priority control circuit for ice distribution systems. 4,124,145, Cl. 222-56.000.
Spitzer, Joseph G.; Small, Marvin; Osipow, Lloyd I.; and Marra, Dorothea C. Aerosol container with position-sensitive shut-off valve. 4,124,149, Cl. 222-402.190.
Sporenberg, Willi; and Wagner, Reinhold, to Sundwiger Eisenhutte Maschinenfabrik Grah & Co.; and Aluminium Norf GmbH. Process for heating metal strips, in particular non-ferrous metal strips. 4,124,415, Cl. 148-13.000.
Sprecker, Mark A.; Kryschuk, John J.; and Hall, John B., to International Flavors & Fragrances Inc. Process for preparing substituted oxyacetaldehydes and acetals thereof. 4,124,644, Cl. 260-602.000.
Spretnjak, Steve A., to Excel Industries, Inc. Window assembly for a vehicle. 4,124,054, Cl. 160-90.000.
Stadler, Paul: *See—*
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Stal Refrigeration AB: *See—*
Lundberg, Knut A. L., 4,124,046, Cl. 141-287.000.
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Standard Oil Company: *See—*
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Stang, Donald A., to Martin Marietta Corporation. Parabolic mirror construction. 4,124,277, Cl. 350-310.000.
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Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,124,376, Cl. 71-118.000.
Schramer, Kurt M.; and Ocampo, Don O., 4,124,431, Cl. 156-309.000.
Stauter, John C.; and Um, Richard T., to UOP Inc. Production of metallic lead. 4,124,457, Cl. 204-66.000.
Stauter, John C., to UOP Inc. Production of metallic lead. 4,124,461, Cl. 204-117.000.
Steele, Donald F., to Electro Signal Lab, Inc. Optical smoke detector inlet screen. 4,124,298, Cl. 356-338.000.
Stejskal, Miroslav: *See—*
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Sterling Detroit Company: *See—*
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Sterling Drug Inc.: *See—*
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Sterlini, Jacques, to CEM-Compagni Electro-Mecanique. Process and apparatus for mixing gases and liquids. 4,124,660, Cl. 261-21.000.
Steudel, Fritz, to Raytheon Company. Phased power switching system for scanning antenna array. 4,124,852, Cl. 343-854.000.
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Stickler, Roland: *See—*
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Stockman, Richard F., to Air Preheater Company, Inc., The. Sector plate. 4,124,063, Cl. 165-9.000.
Stoger, Max H. Overcurrent protection equipment. 4,124,833, Cl. 335-186.000.
Stone, Herman; and Pauly, Peter D., to Tenneco Chemicals, Inc. One-shot process for making a filled detergent polyurethane foam. 4,124,518, Cl. 252-91.000.
Stoor, Jon D., to AMF Incorporated. Defrost timer having selectable defrost time. 4,123,915, Cl. 62-234.000.
Storace, Anthony: *See—*
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Stoschek, Michael. Radio and/or telephone communication system for a fleet of vehicles. 4,124,815, Cl. 325-51.000.
Stournas, Stamoulis; and Heiba, El-Ahmadi Ibrahim, to Mobil Oil Corporation. Oil recovery by waterflooding employing succinimido aryl sulfonate surfactants. 4,124,512, Cl. 252-8.55D.
Strauff, Gunther, to Langen & Co. Pressure control means for distribution of medium from a reservoir or storage vessel. 4,123,964, Cl. 91-434.000.
Strobel, Walter: *See—*
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Strong, Herbert M.; Chrenko, Richard M.; and Tuft, Roy E., to General Electric Company. Annealing type Ib or mixed type Ib-Ia natural diamond crystal. 4,124,690, Cl. 423-446.000.
Stroupe, James D., to Sipler Plastics, Inc. Method of making tortuous tubular articles. 4,124,678, Cl. 264-314.000.
Stump, C. Roscoe; and Van Dam, John F., Jr., to Bell & Howell Company. Label cutting head. 4,124,435, Cl. 156-521.000.
Stutz, Peter; and Stadler, Paul, to Sandoz Ltd. Ergot peptide alkaloid derivatives. 4,124,712, Cl. 424-250.000.
Sudworth, James L., to Chloride Silent Power Ltd. Alkali metal-sulphur cells. 4,124,739, Cl. 429-61.000.
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Suganuma, Koichi, to Okubo Haguruma Kogyo Kabushiki Kaisha. Direct drum drive for concrete mixer trucks. 4,124,304, Cl. 366-60.000.
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Sung, Benjamin T.; and Lumpkin, Richard C., to Burroughs Corporation. Document sorter system having interchangeable pocket modules. 4,124,121, Cl. 209-583.000.
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Suzuki, Kazuhiro: *See—*
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Swiss Aluminium Ltd.: *See—*
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Tajima, Osamu, to Victor Company of Japan, Ltd. Signal pick-up apparatus for reproducing a recording disc. 4,124,217, Cl. 274-37.000.
Takabatake, Hideo, to Yoshida Kogyo K.K. Lockable sliders. 4,123,829, Cl. 24-205.00R.
Takahashi, Hiroshi: *See—*
Yui, Hiroshi; Hayama, Kazuhide; and Takahashi, Hiroshi, 4,124,562, Cl. 260-42.140.
Takahashi, Tetsuo, to Torio Kabushiki Kaisha. Bandwidth switching circuit for intermediate frequency amplifier stage in FM receiver. 4,124,817, Cl. 325-344.000.
Takayanagi, Takeo. Azo compounds of sulfanilamide derivatives. 4,124,580, Cl. 260-157.000.
Takeda, Kunihiko: *See—*
Miyake, Tetsuya; and Takeda, Kunihiko, 4,124,770, Cl. 568-758.000.
Takeshi, Kunio: *See—*
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Taki, Tomohiko, to Hitachi, Ltd. Automatic control systems for a well pump installation. 4,124,331, Cl. 417-19.000.
Takise, Tadashi; Sekiguchi, Keisuke; and Matsudaira, Takeshi, to Sony Corporation. Acoustic measuring system. 4,124,895, Cl. 364-514.000.
Tamura, Junichi: *See—*
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Tanabe Seiyaku Co., Ltd.: *See—*
Chibata, Ichiro; Sumi, Akihiko; and Ohtsuki, Osamu, 4,124,636, Cl. 562-402.000.
Tanaka, Akio, to International Fastener Establishment. Separable fastener. 4,123,826, Cl. 24-204.000.
Tanaka, Kazuo; and Takeshi, Kunio, to Canon Kabushiki Kaisha. Zoom lens having closeup focusing control. 4,124,274, Cl. 350-184.000.
Tanaka, Shigeaki: *See—*
Itoh, Kinya; Tanaka, Shigeaki; Shimizu, Gen; and Suganuma, Yuzi, 4,123,851, Cl. 34-48.000.
Tarhan, Mehmet O.; and Kwasnoski, Daniel. Method for substantially complete removal of hydrogen sulfide from sulfur bearing industrial gases. 4,124,685, Cl. 423-574.00L.
Tarr, Fred P., to Polaroid Corporation. Camera having dual film capacity. 4,124,856, Cl. 354-86.000.
Taylor, Alec Henry: *See—*
Blue, Archie H., 4,124,463, Cl. 204-129.000.
Taylor, Chester J., to United States of America, Army. Radiator shutter for arctic vehicles. 4,124,066, Cl. 165-98.000.
Taylor, Lloyd D.: *See—*
Bronstein-Bonte, Irena Y.; and Taylor, Lloyd D., 4,124,388, Cl. 96-29.00D.
Taylor, William R.: *See—*
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Teijin Limited: *See—*
Saiki, Noritsugu; Kurisu, Shizuka; and Kawase, Shoji, 4,124,566, Cl. 528-177.000.
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Teledyne Industries, Inc.: *See—*
Hill, Ernest W.; Maier, Dale E.; and Humphrey, Melvin R., 4,123,930, Cl. 72-466.000.
Schmuck, Charles M., 4,124,114, Cl. 198-482.000.
Telenkov, Vyacheslav V.: *See—*
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Stone, Herman; and Pauly, Peter D., 4,124,518, Cl. 252-91.000.
Terasawa, Mititaka; Mawatari, Katsuhiko; and Morimiya, Osamu, to Tokyo Shibaura Electric Co., Ltd. Method and apparatus for implanting radioactive gas in a base material. 4,124,802, Cl. 250-492.00A.
Tesch, Allen. Incinerator. 4,123,979, Cl. 110-212.000.
Texaco Development Corporation: *See—*
Knifton, John F., 4,124,617, Cl. 260-410.000.
Watts, Lewis W., Jr.; and Yeakey, Ernest L., 4,124,758, Cl. 536-43.000.

Texaco Exploration Canada Ltd.: *See*—
Redford, David A., 4,124,072, Cl. 166-270.000.
Texaco Inc.: *See*—
Allen, Joseph C.; and Korstad, Ralph J., 4,124,071, Cl. 166-263.000.
Allen, Joseph C.; and Harnsberger, Bobby G., 4,124,074, Cl. 166-278.000.
Larkin, John M., 4,124,608, Cl. 260-405.000.
Pogonowski, Ivo C., 4,123,913, Cl. 405-244.000.
Woodle, Robert A., 4,124,896, Cl. 364-557.000.
Yaffe, Roberta, 4,124,513, Cl. 252-46.700.
Yaffe, Roberta, 4,124,514, Cl. 252-46.700.
Texacone Company, The: *See*—
Wheeler, John H., 4,123,990, Cl. 118-76.000.
Thedford, Shirley C. Fluid filled insole. 4,123,855, Cl. 36-44.000.
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Eicken, Karl; Theobald, Hans; Hansen, Hanspeter; Wuerzer, Bruno; and Fett, Kurt, 4,124,591, Cl. 260-307.00H.
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Reed, Russell, Jr.; Meyer, Robert E.; Shaw, Graham C.; and Cornia, Richard P., 4,124,418, Cl. 149-7.000.
Thomas, Michael D., to Ryder International Corporation. Pill dispenser. 4,124,143, Cl. 221-82.000.
Thompson, Gregory J., to UOP Inc. Heat exchange tube for fluidized bed reactor. 4,124,068, Cl. 165-134.00R.
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Hughes, Richard S.; and Thompson, Julian L., 4,124,297, Cl. 356-308.000.
Thompson, Kenneth B. Optical viewing apparatus. 4,124,798, Cl. 250-213.0VT.
Thomson-Brandt: *See*—
Huignard, Jean-Pierre; and Puech, Claude, 4,124,273, Cl. 350-150.000.
Malissin, Roland; and Roullet, Gerald, 4,124,868, Cl. 358-128.000.
Thomson-CSF: *See*—
Bert, Alain, 4,124,828, Cl. 333-30.00R.
Micheron, Francois; and Huignard, Jean Pierre, 4,124,268, Cl. 350-3.630.
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Timmerman, Robert W. Heating system. 4,124,177, Cl. 237-2.00B.
Tinney, Francis J.; Lunney, Elizabeth A.; and Nicolaides, Ernest D., to Warner-Lambert. Nonapeptides and methods for their production. 4,124,577, Cl. 260-112.5LH.
TMC Corporation: *See*—
Kubelka, Axel R., 4,124,223, Cl. 280-605.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Itoh, Takuji; Sakurada, Satoshi; and Tagaya, Nobuaki, 4,124,536, Cl. 252-455.00R.
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Tokawa, Daniel T.; Mentz, Bernardus J.; Eng, Jeffrey D.; Cook, Edward H., Jr.; and Marks, Gerald R., to Hooker Chemicals & Plastics Corp. Electrolytic cell utilizing pretreated semi-permeable membranes. 4,124,477, Cl. 204-252.000.
Tokico Ltd.: *See*—
Hatakeyama, Susumu, 4,124,202, Cl. 267-118.000.
Tokyo Kinzoku Co. Ltd.: *See*—
Kasahara, Yasuo, 4,124,831, Cl. 335-16.000.
Tokyo Shibaura Electric Co., Ltd.: *See*—
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Torio Kabushiki Kaisha: *See*—
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Torneback, Goran. Arrangement for sliding the load carrier of a long trailer to and fro. 4,124,131, Cl. 214-83.240.
Toshiba Kikai Kabushiki Kaisha: *See*—
Saijo, Hiromu; Miyazaki, Shigeru; Kanazawa, Koichi; Tomura, Nobuhide; and Ozawa, Toshihiro, 4,124,677, Cl. 264-289.000.
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Towne Robinson Fastener Company: *See*—
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
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Green, William F., 4,124,271, Cl. 350-96.200.
Transequip Inc.: *See*—
Nordstrom, Arnold B., 4,124,119, Cl. 206-335.000.
Transue, James A., to Singer Company, The. Retractable needle basting mechanism. 4,123,983, Cl. 112-221.000.
Trees, Carl I., to Lodge & Shipley Company, The. Case indexer. 4,124,113, Cl. 198-476.000.
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Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. Meso-ionic didehydro derivatives of 1,7-dehydro-1-substituted-3H-pyrazolo[4,3-e]-1,2,4-triazolo[4,3-c]pyrimidine-3-thiones and 3-ones. 4,124,764, Cl. 544-251.000.
Triax Company, The: *See*—
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Tricil Limited: *See*—
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Mines, Gordon L.; and Consiglio, Aldo J., 4,124,267, Cl. 339-125.00R.
Tsien, Hsue C.; Shropshire, Joseph A.; and Venero, Agustin F. Thin sheet apparatus and a fluid flow device. 4,124,478, Cl. 204-255.000.
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Tsybulevsky, Albert M.; Danilushkina, Kapitolina P.; and Pak, Petr M. Process for reforming and dewaxing by selective hydrocracking of hydrocarbon fractions. 4,124,487, Cl. 208-111.000.
Tucker, Robert C., Jr.: *See*—
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Turillon, Pierre P.: *See*—
Nordblom, George F.; Turillon, Pierre P.; Huston, Ernest L.; and Keresztes, Stephan L., 4,124,746, Cl. 429-210.000.
Turk, Frederick J., to Minnesota Mining and Manufacturing Company. Quick slide connector. 4,124,265, Cl. 339-97.00R.
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Uchidoi, Masanori; Miyakawa, Hideaki; Aizawa, Hiroshi; Yamamichi, Masayoshi; Ohshima, Osamu; and Tunekawa, Tokuichi, to Canon

Kabushiki Kaisha. Automatic exposure control apparatus and a camera having the same. 4,124,855, Cl. 354-24.000.
Udelson, Burton J.: *See—*
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Uede, Hisashi: *See—*
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Uerdingen, Walter: *See—*
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Uesugi, Kyozo, to Minolta Camera Kabushiki Kaisha. Compact varifocal lens assembly. 4,124,275, Cl. 350-187.000.
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Um, Richard T.: *See—*
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D'Silva, Themistocles D. J., 4,124,721, Cl. 424-285.000.
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Kotval, Peshotan S.; and Strock, Harold B., 4,124,410, Cl. 136-89.0TF.
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Uniroyal, Inc.: *See—*
Mao, Chung-Ling, 4,124,572, Cl. 528-76.000.
United Kingdom Atomic Energy Authority: *See—*
Penn, Alan W., 4,124,029, Cl. 128-419.00P.
United States Borax & Chemical Corp.: *See—*
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United States Lines, Inc.: *See—*
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Whelan, James M., 4,124,694, Cl. 423-538.000.
Whelan, James M., 4,124,695, Cl. 423-538.000.
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Frame, Robert R., 4,124,494, Cl. 208-207.000.
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Kelly, Robert C., 4,124,599, Cl. 260-345.200.
Morton, Douglas R., Jr., 4,124,615, Cl. 280-408.000.
Peterson, David C., 4,124,610, Cl. 260-408.000.
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Urmston, Charles W. B. Aerated concrete process. 4,124,669, Cl. 264-42.000.
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VanBuskirk, Warren T., to Xerox Corporation. Sorting apparatus and reproducing machine. 4,124,204, Cl. 271-173.000.
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Offermanns, Heribert; Schwarze, Werner; and Vanheertum, Rudolf, 4,124,630, Cl. 260-454.000.

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Vetco, Inc.: *See—*
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Leitert, Frederick C.; and Vinson, Carl G., Jr., 4,124,534, Cl. 252-441.000.

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Vor der Bruck, Dieter; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Disazo dyestuffs containing a thiazole central component. 4,124,581, Cl. 260-158.000.

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W. Wally Niemela, by said Earl J. Lampinen: *See—*
Niemela, W. Wally; and Lampinen, Earl J., 4,123,957, Cl. 83-796.000.

Waffner, William D., to Moore Business Forms, Inc. Feedback enhanced web feeding apparatus. 4,124,156, Cl. 226-25.000.

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Herrig, Klaus; and Wagner, Heinz, 4,124,183, Cl. 245-6.000.

Wagner, Reinhold: *See—*
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Wagstaff, John B., to Pressac Limited. Electrical connecting means. 4,124,266, Cl. 339-97.00C.

Walkenhorst, Wilfried, to Hoechst Aktiengesellschaft. Process for the bulk polymerization of alkenylaromatic compounds. 4,124,656, Cl. 260-878.00R.

Walker, Basil E.; Pohanka, Robert C.; and Rice, Roy W., to United States of America, Navy. Method for strengthening PZT transducers. 4,124,671, Cl. 264-85.000.

Walker, Robert L., to Pacific Saw & Knife Company. Brazing fixture. 4,124,157, Cl. 228-49.000.

Walsh, Edward J., to Westinghouse Electric Corp. Electrical inductive apparatus. 4,124,834, Cl. 336-58.000.

Walther, William D.: *See—*
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Wambach, Allen D.: *See—*
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Tinney, Francis J.; Lunney, Elizabeth A.; and Nicolaides, Ernest D., 4,124,577, Cl. 260-112.5LH.

Washburn, Jerry R., to Computer Automation, Inc. Peripheral-unit controller apparatus. 4,124,888, Cl. 364-200.000.

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Water Services of America, Inc.: *See—*
Leitner, Gordon F.; Wiegratz, Fred G.; Cleaver, John C., deceased; Cleaver, Laird C., personal representative; and First Wisconsin Trust Company, 4,124,065, Cl. 165-95.000.

Waterhouse, John S.: *See—*
Green, George E.; Stark, Bernard P.; and Waterhouse, John S., 4,124,760, Cl. 542-432.000.

Watson, James H. P., to English Clays Lovering Pochin & Co. Limited. Magnetic separators, apparatus and method. 4,124,503, Cl. 210-42.00S.

Watts, Lewis W., Jr.; and Yeakey, Ernest L., to Texaco Development Corporation. Aminated hydroxyalkyl cellulose. 4,124,758, Cl. 536-43.000.

Wayman, Robert W., to Borg-Warner Corporation. Planetary transmission mechanism. 4,123,952, Cl. 74-781.00R.

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Webb, Michael G.: *See—*
Finigan, Arthur; and Webb, Michael G., 4,123,911, Cl. 405-68.000.

Webb, Roderick P.; and Hooper, Raymond C., to Post Office, The. Signal level stabilizer. 4,124,825, Cl. 330-279.000.

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Meyers, George L.; and Webb, Russell R., 4,124,160, Cl. 229-21.000.

Webb, William M., to General Electric Company. Support structure for a cabinet. 4,124,187, Cl. 248-188.300.

Webers, Robert J.: *See—*
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Weder, Donald E.: *See—*
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Weder, Erwin H.; and Weder, Donald E., to Highland Manufacturing and Sales Co., Inc. Hinged plastic Easter egg. 4,124,135, Cl. 220-4.00B.

Weigelt, Christian: *See—*
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,124,597, Cl. 260-343.600.

Weinar, Roger N. Strengthening of channel shaped building columns and beams. 4,123,887, Cl. 52-720.000.

Weiner, Jay H., to Airway Industries, Inc. Method of making a luggage case. 4,123,839, Cl. 29-434.000.

Weinich, Manfred, to Daimler-Benz Aktiengesellschaft. Motor vehicle seat. 4,124,250, Cl. 297-335.000.

Weller, Edward F., III; and Porter, Marion G., to Honeywell Information Systems Inc. Memory access system. 4,124,891, Cl. 364-200.000.

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Welp, Lawrence J.: *See—*
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Wentworth, Robert S., Jr., to Borg-Warner Corporation. Mechanical seal manufacturing process. 4,124,218, Cl. 277-1.000.

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Choyke, Wolfgang J.; and Stickler, Roland, 4,123,833, Cl. 29-25.180.
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Nordby, Craig J., 4,124,885, Cl. 363-56.000.
Otto, Paul R.; and Leang, William N., 4,124,103, Cl. 187-29.00R.
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Westlin, Karl L.; and Cork, Herbert V., Jr., to American Air Filter Company, Inc. Snap together header and cell side assembly. 4,124,362, Cl. 55-509.000.
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Wheeler, Herbert O. Fishing rod holder. 4,124,190, Cl. 248-538.000.
Wheeler, John H., to Texacone Company, The. Sleeve assembly. 4,123,990, Cl. 118-76.000.
Whelan, James M., to University of Southern California. Process for the oxidation of ammonia to nitrous oxide. 4,124,687, Cl. 423-404.000.
Whelan, James M., to University of Southern California. Process for the oxidation of carbon monoxide to carbon dioxide. 4,124,689, Cl. 423-437.000.
Whelan, James M., to University of Southern California. Process for the oxidation of hydrogen sulfide to sulfur trioxide. 4,124,694, Cl. 423-538.000.
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Whelan, James M., to University of Southern California. Process for the oxidation of hydrogen to water. 4,124,697, Cl. 423-580.000.
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White, Thomas G., to Ambac Industries Incorporated. Time delay solenoid operated valve. 4,124,192, Cl. 251-129.000.
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Whiteley, Marie Ellen: *See*—
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Whiteley, William B., to Whiteley, Marie Ellen. Animal handling means. 4,123,993, Cl. 119-103.000.
Whitlock, Kenneth H., to Du Pont de Nemours, E. I., and Company. Elastomer blend. 4,124,653, Cl. 260-873.000.
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Wier, Donald R., to Phillips Petroleum Company. Method of using viscosity-stabilized aqueous solutions. 4,124,073, Cl. 166-272.000.
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Wilhelm, Gerd; Jaschke, Artur; Simon, Hans-Jurgen; Schmidt, Jens; and Sandhu, Surinder S., to Bayer Aktiengesellschaft. Method of keeping nozzle bodies or breaker plates clean during extrusion of polymer melts. 4,124,666, Cl. 264-39.000.
Wilks, Howard G., to Gould Inc. Electric fuse. 4,124,836, Cl. 337-186.000.
Williams, Charles E. Rotary breech apparatus for an automatic weapon. 4,123,962, Cl. 89-13.00R.
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Wilson, Hugh R. Gunpowder charge and projectile container. 4,123,868, Cl. 42-90.000.
Wilson, Leslie P. S., to Ocean Water Limited. Water purification by reverse osmosis. 4,124,488, Cl. 210-134.000.
Windelbandt, Herbert; and Ditges, Gunter, to Meyer, Roth & Pastor Maschinenfabrik GmbH. Method for bending chain links and chain link bending machine. 4,123,899, Cl. 59-27.000.
Winston, Emanuel A. Root feeder. 4,123,980, Cl. 111-92.000.
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Wiskirchen, Edward L. Fishhook. 4,123,870, Cl. 43-42.370.
Witt, Gordon. Goose and duck blind. 4,123,869, Cl. 43-1.000.
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Wolf, Anthony D.; to Du Pont de Nemours, E. I., and Company. Tetrahydroindazole herbicides. 4.124,373, Cl. 71-92.000.
Wolf, Anthony D., to Du Pont de Nemours, E. I., and Company. Alkyl-substituted cycloalkanapyrazole herbicides. 4,124,374, Cl. 71-92.000.
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Wolfla, Thomas A.; and Tucker, Robert C., Jr., to Union Carbide Corporation. High temperature wear resistant coating composition. 4,124,737, Cl. 428-640.000.
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Wommelsdorf, Fritz; and Schmidt, Werner, to Maschinenfabrik Rissen GmbH. Apparatus for lining by lamination air-permeable containers with thermoplastic sheeting or film. 4,124,434, Cl. 156-475.000.
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Wood, Irwin B., to American Cyanamid Co. Control of swine dysentery with AV290 and salts or complexes thereof. 4,124,626, Cl. 424-118.000.
Wood, Ross Derisley: *See*—
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Woodle, Robert A., to Texaco Inc. Miscibility temperature signal means. 4,124,896, Cl. 364-557.000.
Worrall, Roy R. Circuit for use in electronic game of nim. 4,124,211, Cl. 273-237.000.
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Yano, Kozo; Inami, Yasuhiko; Hamada, Hiroshi; and Uede, Hisashi, to Sharp Kabushiki Kaisha. Electrochromic display device manufacture method. 4,123,841, Cl. 29-570.000.
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Yen, Teh F.; and Findley, John E., to University of Southern California. Purifying oil shale retort water. 4,124,501, Cl. 210-16.000.

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Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S., 4,124,442, Cl. 176-36.00C.

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Zavatsky, Vladimir N.: *See*—
Yagupolsky, Lev M.; Zavatsky, Vladimir N.; Semeny, Valery Y.; Bildinov, Konstantin N.; Serebrov, Petr V.; Goncharenko, Alevtina A.; Kirsanov, Alexandr V.; Lyapunov, Mikhail I.; and Feschenko, Ninel G., 4,124,456, Cl. 204-59.00R.

Zecher, Wilfried; Dunwald, Willi; and Merten, Rudolf, to Bayer Aktiengesellschaft. Polycondensates. 4,124,568, Cl. 528-59.000.

Zeller, Gregor, to Petri AG, Firma. Energy absorption element. 4,123,948, Cl. 74-492.000.

Zetter, Mark S.; and Micko, Eric S., to Delphian Corporation. Hydrogen sulfide monitoring system. 4,124,475, Cl. 204-195.00R.

Zeuthen, Karl G., to Rex-Rotary International Corporation A.S. Scanning mechanism for an electrostatic copier. 4,124,288, Cl. 355-8.000.

Zhuchkov, Ivan I.; Gorjunov, Vladimir S.; Zaitsev, Boris I.; Derevyankin, Nikolai E.; Petrov, Vladimir A.; Istomin, Semen D.; Kovalenchik, Davyd I.; Arkhipov, Evgeny A.; Serebryakov, Valery I.; and Kachalin, Vladimir S. Regulating rod drive of nuclear reactor. 4,124,442, Cl. 176-36.00C.

Ziegler, Michael J.; and Lee, Thomas D., to Allen-Stevens Corporation. Gasketed flange sealer. 4,124,140, Cl. 220-304.000.

Zimowski, Vera. Teaching device. 4,123,852, Cl. 35-62.000.

Zizka, Jaroslav; Janousek, Karel; and Papanek, Miroslav, to Vyzkumny Ustav Chemickych Zarizeni. Cigarette filter. 4,124,033, Cl. 131-10.900.

Zneimer, Joel E., to Bell & Howell Company. Magnetic information transducer assembly. 4,124,874, Cl. 360-121.000.

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CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 24,017	3,914,140	Oct. 21, 1975	B 287,275	3,925,141	Dec. 9, 1975
B 24,018	3,914,206	Oct. 21, 1975	B 287,373	3,918,568	Nov. 11, 1975
B 64,868	3,914,141	Oct. 21, 1975	B 288,018	3,925,239	Dec. 9, 1975
B 78,331	3,914,142	Oct. 21, 1975	B 288,627	3,916,179	Oct. 28, 1975
B 112,422	3,913,484	Oct. 21, 1975	B 288,638	3,925,132	Dec. 9, 1975
B 150,560	3,913,654	Oct. 21, 1975	B 289,175	3,924,309	Dec. 9, 1975
B 176,995	3,915,773	Oct. 28, 1975	B 289,471	3,917,184	Nov. 4, 1975
B 178,475	3,944,602	Mar. 16, 1976	B 289,523	3,921,166	Nov. 18, 1975
B 189,772	3,925,367	Dec. 9, 1975	B 289,883	3,925,063	Dec. 9, 1975
B 189,773	3,925,405	Dec. 9, 1975	B 290,328	3,924,838	Dec. 9, 1975
B 190,679	3,925,346	Dec. 9, 1975	B 291,104	3,925,007	Dec. 9, 1975
B 198,810	3,916,043	Oct. 28, 1975	B 291,694	3,925,339	Dec. 9, 1975
B 204,161	3,924,605	Dec. 9, 1975	B 292,054	3,915,877	Oct. 28, 1975
B 207,272	3,914,123	Oct. 21, 1975	B 292,126	3,914,465	Oct. 21, 1975
B 211,786	3,914,300	Oct. 21, 1975	B 292,140	3,914,340	Oct. 21, 1975
B 213,211	3,925,269	Dec. 9, 1975	B 292,300	3,927,167	Dec. 16, 1975
B 220,683	3,914,471	Oct. 21, 1975	B 292,563	3,923,653	Dec. 2, 1975
B 222,188	3,914,739	Oct. 21, 1975	B 293,378	3,923,725	Dec. 2, 1975
B 223,621	3,925,526	Dec. 9, 1975	B 293,437	3,913,414	Oct. 21, 1975
B 224,323	3,925,476	Dec. 9, 1975	B 294,103	3,924,396	Dec. 9, 1975
B 233,383	3,925,424	Dec. 9, 1975	B 294,579	3,916,737	Nov. 4, 1975
B 233,741	3,925,326	Dec. 9, 1975	B 294,673	3,916,023	Oct. 28, 1975
B 235,011	3,925,086	Dec. 9, 1975	B 295,481	3,921,593	Nov. 25, 1975
B 235,925	3,924,949	Dec. 9, 1975	B 295,674	3,916,107	Oct. 28, 1975
B 236,609	3,925,187	Dec. 9, 1975	B 295,860	3,923,880	Dec. 2, 1975
B 237,953	3,924,051	Dec. 2, 1975	B 299,267	3,917,106	Nov. 4, 1975
B 239,289	3,922,711	Nov. 25, 1975	B 300,353	3,921,734	Nov. 25, 1975
B 241,433	3,923,711	Dec. 2, 1975	B 302,271	3,929,130	Dec. 30, 1975
B 245,194	3,919,179	Nov. 11, 1975	B 302,692	3,924,598	Dec. 9, 1975
B 248,916	3,920,862	Nov. 18, 1975	B 302,836	3,923,573	Dec. 2, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 302,998	3,928,233	Dec. 23, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 303,011	3,930,188	Dec. 30, 1975
B 252,947	3,923,803	Dec. 2, 1975	B 303,702	3,914,131	Oct. 21, 1975
B 254,211	3,917,677	Nov. 4, 1975	B 304,687	3,924,783	Dec. 9, 1975
B 254,708	3,923,878	Dec. 2, 1975	B 305,417	3,915,882	Oct. 28, 1975
B 255,756	3,923,781	Dec. 2, 1975	B 305,868	3,921,463	Nov. 25, 1975
B 256,334	3,924,988	Dec. 9, 1975	B 305,881	3,923,478	Dec. 2, 1975
B 256,936	3,925,513	Dec. 9, 1975	B 306,655	3,924,642	Dec. 9,1975
B 258,687	3,914,221	Oct. 21, 1975	B 306,829	3,925,411	Dec. 9, 1975
B 259,236	3,924,874	Dec. 9, 1975	B 306,938	3,916,050	Oct. 28, 1975
B 259,274	3,928,688	Dec. 23, 1975	B 307,677	3,915,276	Oct. 28, 1975
B 260,455	3,925,634	Dec. 9, 1975	B 308,661	3,924,349	Dec. 9, 1975
B 260,945	3,925,250	Dec. 9, 1975	B 308,892	3,919,624	Nov. 11, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 309,207	3,914,743	Oct. 21, 1975
B 261,828	3,925,551	Dec. 9, 1975	B 309,499	3,922,002	Nov. 25, 1975
B 262,241	3,925,528	Dec. 9, 1975	B 309,681	3,927,374	Dec. 16, 1975
B 262,287	3,921,209	Nov. 18, 1975	B 309,755	3,919,468	Nov. 11, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 309,756	3,914,136	Oct. 21, 1975
B 262,599	3,925,323	Dec. 9, 1975	B 309,860	3,922,485	Nov. 25, 1975
B 264,257	3,928,665	Dec. 23, 1975	B 310,149	3,924,705	Dec. 9, 1975
B 264,833	3,923,566	Dec. 2, 1975	B 310,271	3,923,689	Dec. 2, 1975
B 265,369	3,925,245	Dec. 9, 1975	B 310,740	3,985,686	Oct. 12, 1976
B 265,727	3,914,479	Oct. 21, 1975	B 311,313	3,925,142	Dec. 9, 1975
B 265,862	3,915,915	Oct. 28, 1975	B 311,317	3,918,975	Nov. 11, 1975
B 266,195	3,923,599	Dec. 2, 1975	B 311,413	3,925,515	Dec. 9, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 311,910	3,924,357	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 311,977	3,925,233	Dec. 9,1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,029	4,072,769	Jan. 28, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 313,594	3,924,626	Dec. 9, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 313,900	3,915,932	Oct. 28, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,049	3,920,588	Nov. 18, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,390	3,924,576	Dec. 9,1975	B 315,828	4,124,275	Jan. 28, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,014	3,920,861	Nov. 18, 1975
B 283,124	3,923,512	Dec. 2, 1975	B 316,239	3,913,546	Oct. 21, 1975
B 283,300	3,925,011	Dec. 9, 1975	B 316,422	4,016,206	Apr. 19, 1977
B 284,297	3,913,722	Oct. 21, 1975	B 316,917	3,925,494	Dec. 9, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 317,080	3,925,324	Dec. 9, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 317,347	3,923,552	Dec. 2, 1975
B 285,796	3,914,303	Oct. 21, 1975	B 317,624	3,925,167	Dec. 9, 1975
B 286,499	3,914,129	Oct. 21, 1975	B 318,122	4,026,905	May 31, 1977
B 286,614	3,924,696	Dec. 9, 1975	B 318,195	3,915,699	Oct. 28, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 318,745	3,916,571	Nov. 4, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 319,226	3,925,082	Dec. 9, 1975	B 344,203	3,928,719	Dec. 23, 1975
B 319,339	3,916,056	Oct. 28, 1975	B 344,479	3,924,042	Dec. 2, 1975
B 319,402	3,919,568	Nov. 11, 1975	B 345,060	3,916,018	Oct. 28, 1975
B 319,414	3,928,666	Dec. 23, 1975	B 345,384	3,916,146	Oct. 28, 1975
B 320,261	3,924,033	Dec. 2, 1975	B 345,390	3,940,343	Feb. 24, 1976
B 320,452	3,925,083	Dec. 9, 1975	B 345,422	3,914,392	Oct. 21, 1975
B 320,603	3,915,571	Oct. 28, 1975	B 345,527	3,927,365	Dec. 16, 1975
B 321,018	3,921,623	Nov. 25, 1975	B 345,567	3,913,985	Oct. 21, 1975
B 321,101	3,917,163	Nov. 4, 1975	B 346,044	3,988,405	Oct. 26, 1976
B 321,938	3,923,889	Dec. 2, 1975	B 346,145	3,913,293	Oct. 21, 1975
B 322,182	3,925,390	Dec. 9, 1975	B 346,210	3,916,142	Oct. 28, 1975
B 322,239	3,920,973	Nov. 18, 1975	B 346,350	3,915,824	Oct. 28, 1975
B 322,564	3,914,373	Oct. 21, 1975	B 346,487	3,927,406	Dec. 16, 1975
B 322,621	3,920,863	Nov. 18,1975	B 346,585	3,913,820	Oct. 21, 1975
B 322,777	3,924,382	Dec. 9, 1975	B 346,613	3,923,545	Dec. 2, 1975
B 323,127	3,923,967	Dec. 2, 1975	B 346,901	3,915,583	Oct. 28, 1975
B 323,191	3,914,566	Oct. 21, 1975	B 348,083	3,923,774	Dec. 2, 1975
B 323,203	3,916,165	Oct. 28, 1975	B 348,383	3,923,452	Dec. 2, 1975
B 323,568	3,920,536	Nov. 18, 1975	B 348,495	3,914,654	Oct. 21, 1975
B 323,666	3,924,568	Dec. 9, 1975	B 348,558	3,914,109	Oct. 21, 1975
B 324,495	3,928,664	Dec. 23, 1975	B 349,141	3,915,363	Oct. 28, 1975
B 324,503	3,928,524	Dec. 23, 1975	B 349,177	3,914,033	Oct. 21, 1975
B 324,505	3,925,294	Dec. 9, 1975	B 349,231	3,915,831	Oct. 28, 1975
B 324,739	3,924,990	Dec. 9, 1975	B 349,321	3,916,103	Oct. 28, 1975
B 324,879	3,923,538	Dec. 2, 1975	B 349,948	3,914,557	Oct. 21, 1975
B 325,102	3,924,355	Dec. 9, 1975	B 350,025	3,927,415	Dec. 16, 1975
B 325,261	3,921,304	Nov. 25,1975	B 350,143	3,924,419	Dec. 9, 1975
B 326,514	3,925,080	Dec. 9, 1975	B 350,219	3,917,802	Nov. 4, 1975
B 327,109	3,925,350	Dec. 9, 1975	B 350,245	3,914,331	Oct. 21, 1975
B 327,363	3,923,504	Dec. 2, 1975	B 350,523	3,924,726	Dec. 9, 1975
B 327,612	3,925,620	Dec. 9, 1975	B 350,589	3,927,419	Dec. 16, 1975
B 327,674	3,918,540	Nov. 11, 1975	B 350,708	3,923,871	Dec. 2, 1975
B 327,899	3,925,674	Dec. 9, 1975	B 350,843	3,915,461	Oct. 28, 1975
B 328,164	3,914,703	Oct. 21, 1975	B 351,055	3,914,074	Oct. 21, 1975
B 328,200	3,916,031	Oct. 28, 1975	B 351,218	3,914,186	Oct. 21, 1975
B 328,205	3,914,106	Oct. 21, 1975	B 351,222	3,921,179	Nov. 18, 1975
B 328,210	3,914,275	Oct. 21, 1975	B 351,348	3,923,563	Dec. 2, 1975
B 328,391	4,039,888	Aug. 2, 1977	B 351,421	3,914,733	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975	B 351,493	3,914,758	Oct. 21, 1975
B 329,115	3,924,727	Dec. 9, 1975	B 351,535	3,915,239	Oct. 28, 1975
B 329,476	3,920,562	Nov. 18, 1975	B 351,665	3,919,701	Nov. 11, 1975
B 329,612	3,925,128	Dec. 9, 1975	B 351,672	3,914,000	Oct. 21, 1975
B 329,787	3,920,688	Nov. 18, 1975	B 351,673	4,076,529	Jan. 28, 1975
B 329,816	3,923,947	Dec. 2, 1975	B 351,735	3,913,385	Oct. 21, 1975
B 330,536	3,925,452	Dec. 9, 1975	B 351,863	3,914,700	Oct. 21, 1975
B 330,828	3,913,589	Oct. 21, 1975	B 351,883	3,924,657	Dec. 9, 1975
B 331,417	3,914,157	Oct. 21, 1975	B 351,926	3,914,133	Oct. 21, 1975
B 331,557	3,916,577	Nov. 4, 1975	B 351,939	3,913,480	Oct. 21, 1975
B 331,895	3,916,403	Oct. 28, 1975	B 352,445	3,928,746	Dec. 23, 1975
B 332,527	3,924,017	Dec. 2, 1975	B 352,934	3,913,692	Oct. 21, 1975
B 332,811	3,924,359	Dec. 9, 1975	B 352,950	3,922,590	Nov. 25, 1975
B 333,876	3,921,208	Nov. 18, 1975	B 352,965	3,921,926	Nov. 25, 1975
B 333,928	3,927,172	Dec. 16, 1975	B 353,317	3,916,446	Nov. 4, 1975
B 334,251	3,924,719	Dec. 9, 1975	B 353,387	3,924,404	Dec. 9, 1975
B 334,868	3,919,469	Nov. 11, 1975	B 353,546	3,913,273	Oct. 21, 1975
B 334,985	3,923,912	Dec. 2, 1975	B 354,008	3,925,081	Dec. 9, 1975
B 335,670	3,928,686	Dec. 23, 1975	B 354,098	3,925,547	Dec. 9, 1975
B 335,741	3,925,615	Dec. 9, 1975	B 354,145	3,927,279	Dec. 16, 1975
B 335,773	3,920,953	Nov. 18, 1975	B 354,296	3,914,580	Oct. 21, 1975
B 336,129	3,923,606	Dec. 2, 1975	B 354,510	3,928,658	Dec. 23, 1975
B 336,243	3,925,422	Dec. 9, 1975	B 354,889	3,913,204	Oct. 21, 1975
B 336,345	3,925,179	Dec. 9, 1975	B 354,979	3,914,251	Oct. 21, 1975
B 336,652	3,914,211	Oct. 21, 1975	B 355,095	3,925,656	Dec. 9, 1975
B 336,902	3,918,897	Nov. 11, 1975	B 355,269	3,914,561	Oct. 21, 1975
B 336,946	3,919,425	Nov. 11, 1975	B 355,510	3,913,704	Oct. 21, 1975
B 336,978	3,923,968	Dec. 2, 1975	B 355,595	3,925,649	Dec. 9, 1975
B 337,235	3,919,386	Nov. 11, 1975	B 355,876	3,925,685	Dec. 9, 1975
B 337,409	3,925,258	Dec. 9, 1975	B 356,032	3,928,636	Dec. 23, 1975
B 337,442	3,913,658	Oct. 21, 1975	B 356,253	3,925,025	Dec. 9, 1975
B 337,703	3,914,690	Oct. 21, 1975	B 356,602	3,927,393	Dec. 16, 1975
B 337,787	3,923,506	Dec. 2, 1975	B 356,724	3,924,586	Dec. 9, 1975
B 339,059	3,924,822	Dec. 9, 1975	B 357,039	3,924,406	Dec. 9, 1975
B 339,218	3,925,121	Dec. 9, 1975	B 357,057	3,913,738	Oct. 21, 1975
B 339,699	3,933,527	Jan. 20, 1976	B 357,131	3,924,453	Dec. 9, 1975
B 339,838	3,930,221	Dec. 30, 1975	B 357,402	3,914,180	Oct. 21, 1975
B 340,212	3,922,645	Nov. 25, 1975	B 357,682	3,924,973	Dec. 9, 1975
B 340,833	3,925,208	Dec. 9, 1975	B 357,803	3,919,470	Nov. 11, 1975
B 341,579	3,913,363	Oct. 21, 1975	B 358,174	3,924,958	Dec. 9, 1975
B 342,084	3,928,694	Dec. 23, 1975	B 358,244	3,913,411	Oct. 21, 1975
B 342,423	3,925,334	Dec. 9, 1975	B 358,311	3,923,561	Dec. 2, 1975
B 342,763	4,051,920	Oct. 4, 1977	B 358,939	3,924,713	Dec. 9, 1975
B 342,886	3,923,507	Dec. 2, 1975	B 359,174	3,914,117	Oct. 21, 1975
B 343,136	3,919,453	Nov. 11, 1975	B 359,187	3,924,525	Dec. 9, 1975
B 343,240	3,925,693	Dec. 9, 1975	B 359,540	3,915,235	Oct. 28, 1975
B 343,506	3,916,021	Oct. 28, 1975	B 359,740	3,936,212	Feb. 3, 1976
B 343,577	3,921,165	Nov. 18, 1975	B 359,791	3,929,430	Dec. 30, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 359,825	3,921,344	Nov. 25, 1975	B 381,632	3,914,732	Oct. 21, 1975
B 359,946	3,914,132	Oct. 21, 1975	B 381,847	3,921,152	Nov. 18, 1975
B 359,947	3,914,653	Oct. 21, 1975	B 382,018	3,929,742	Dec. 30, 1975
B 360,208	3,923,750	Dec. 2, 1975	B 382,021	3,913,212	Oct. 21, 1975
B 360,296	3,916,720	Nov. 4, 1975	B 382,261	3,914,991	Oct. 28, 1975
B 360,719	3,915,715	Oct. 28, 1975	B 382,290	3,924,717	Dec. 9, 1975
B 360,910	3,925,696	Dec. 9, 1975	B 382,783	3,919,527	Nov. 11, 1975
B 361,265	3,923,569	Dec. 2, 1975	B 382,798	3,924,435	Dec. 9, 1975
B 361,347	3,914,642	Oct. 21, 1975	B 382,840	3,922,007	Nov. 25, 1975
B 361,443	3,927,405	Dec. 16, 1975	B 383,465	3,927,412	Dec. 16, 1975
B 361,569	3,914,554	Oct. 21, 1975	B 383,581	3,925,318	Dec. 9, 1975
B 361,604	3,922,702	Nov. 25, 1975	B 383,852	3,914,246	Oct. 21, 1975
B 361,734	3,915,764	Oct. 28, 1975	B 384,499	3,925,135	Dec. 9, 1975
B 361,743	4,035,255	July 12, 1977	B 384,658	3,913,452	Oct. 21, 1975
B 361,744	4,035,254	July 12, 1977	B 384,773	3,915,416	Oct. 28, 1975
B 362,589	3,914,012	Oct. 21, 1975	B 385,210	3,913,406	Oct. 21, 1975
B 363,205	3,923,744	Dec. 2, 1975	B 386,403	3,924,895	Dec. 9, 1975
B 363,337	3,928,639	Dec. 23, 1975	B 386,592	3,925,305	Dec. 9, 1975
B 363,457	3,922,595	Nov. 25, 1975	B 387,039	3,924,510	Dec. 9, 1975
B 363,674	3,929,716	Dec. 30, 1975	B 387,331	3,913,701	Oct. 21, 1975
B 363,892	3,913,395	Oct. 21, 1975	B 387,363	3,927,378	Dec. 16, 1975
B 363,962	3,921,826	Nov. 25, 1975	B 387,687	3,918,151	Nov. 11, 1975
B 364,022	3,913,499	Oct. 21, 1975	B 387,761	3,914,245	Oct. 21, 1975
B 364,163	3,916,092	Oct. 28, 1975	B 387,790	3,925,380	Dec. 9, 1975
B 364,241	3,916,668	Nov. 4, 1975	B 387,818	3,918,935	Nov. 11, 1975
B 364,334	3,924,670	Dec. 9, 1975	B 388,580	3,923,712	Dec. 2, 1975
B 364,528	3,919,510	Nov. 11, 1975	B 389,070	3,914,171	Oct. 21, 1975
B 364,786	3,921,673	Nov. 25, 1975	B 389,295	3,914,631	Oct. 21, 1975
B 364,910	3,925,335	Dec. 9, 1975	B 389,327	3,924,504	Dec. 9, 1975
B 365,371	3,988,181	Oct. 26, 1976	B 389,639	3,914,626	Oct. 21, 1975
B 365,490	3,918,527	Nov. 11, 1975	B 389,726	3,921,010	Nov. 18, 1975
B 365,834	3,914,702	Oct. 21, 1975	B 389,807	3,922,623	Nov. 25, 1975
B 365,841	3,925,628	Dec. 9, 1975	B 389,932	3,913,268	Oct. 21, 1975
B 365,855	3,917,258	Nov. 4, 1975	B 389,933	3,913,267	Oct. 21, 1975
B 366,287	3,924,946	Dec. 9, 1975	B 390,679	3,913,668	Oct. 21, 1975
B 366,402	3,928,053	Dec. 23, 1975	B 390,732	3,913,878	Oct. 21, 1975
B 366,589	3,914,719	Oct. 21, 1975	B 390,738	4,035,343	July 12, 1977
B 367,021	3,914,752	Oct. 21, 1975	B 391,184	3,914,214	Oct. 21, 1975
B 367,040	3,924,775	Dec. 9, 1975	B 391,210	3,914,220	Oct. 21, 1975
B 367,661	3,914,158	Oct. 21, 1975	B 391,437	3,915,416	Oct. 28, 1975
B 367,739	3,923,648	Dec. 2, 1975	B 391,509	3,925,175	Dec. 9, 1975
B 367,812	3,924,789	Dec. 9, 1975	B 391,675	3,916,017	Oct. 28, 1975
B 368,081	3,924,691	Dec. 9, 1975	B 392,154	3,923,809	Dec. 2, 1975
B 368,387	3,924,923	Dec. 9, 1975	B 392,242	3,926,636	Dec. 16, 1975
B 368,392	3,913,812	Oct. 21, 1975	B 392,696	3,916,175	Oct. 28, 1975
B 368,397	3,914,677	Oct. 21, 1975	B 392,732	3,914,903	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975	B 392,753	3,916,341	Oct. 28, 1975
B 369,563	3,924,449	Dec. 9, 1975	B 392,894	3,914,763	Oct. 21, 1975
B 369,607	3,923,786	Dec. 2, 1975	B 393,163	3,914,535	Oct. 21, 1975
B 369,997	3,913,533	Oct. 21, 1975	B 393,347	3,985,800	Oct. 12, 1976
B 370,453	3,964,101	Jun. 15, 1976	B 393,970	3,914,638	Oct. 21, 1975
B 370,706	3,925,242	Dec. 9, 1975	B 394,088	3,914,740	Oct. 21, 1975
B 371,073	3,930,135	Dec. 30, 1975	B 394,188	3,924,591	Dec. 9, 1975
B 371,085	3,923,783	Dec. 2, 1975	B 394,300	3,914,159	Oct. 21, 1975
B 371,787	3,921,217	Nov. 18, 1975	B 394,712	3,916,306	Oct. 28, 1975
B 371,805	3,914,433	Oct. 21, 1975	B 395,478	3,922,577	Nov. 25, 1975
B 371,836	3,923,541	Dec. 2, 1975	B 395,496	3,919,435	Nov. 11, 1975
B 372,823	3,924,660	Dec. 9, 1975	B 395,671	3,920,418	Nov. 18, 1975
B 373,051	3,914,162	Oct. 21, 1975	B 395,889	3,913,190	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975	B 396,025	3,913,869	Oct. 21, 1975
B 373,326	3,920,433	Nov. 18, 1975	B 396,551	3,921,929	Nov. 25, 1975
B 373,428	3,915,511	Oct. 28, 1975	B 397,027	3,923,736	Dec. 2, 1975
B 375,220	3,920,417	Nov. 18, 1975	B 397,527	3,913,488	Oct. 21, 1975
B 375,652	3,921,303	Nov. 25, 1975	B 397,990	3,914,848	Oct. 28, 1975
B 376,504	3,914,570	Oct. 21, 1975	B 398,262	3,913,481	Oct. 21, 1975
B 376,654	3,922,513	Nov. 25, 1975	B 398,551	3,924,924	Dec. 9, 1975
B 376,742	3,924,392	Dec. 9, 1975	B 398,597	3,913,743	Oct. 21, 1975
B 376,799	3,913,955	Oct. 21, 1975	B 398,625	3,920,996	Nov. 18, 1975
B 377,172	3,918,255	Nov. 11, 1975	B 399,292	3,914,810	Oct. 28, 1975
B 377,683	3,924,433	Dec. 9, 1975	B 399,304	3,919,567	Nov. 11, 1975
B 377,833	3,913,884	Oct. 21, 1975	B 399,349	3,925,694	Dec. 9, 1975
B 377,869	3,917,002	Nov. 4, 1975	B 399,766	3,915,667	Oct. 28, 1975
B 378,621	3,923,840	Dec. 2, 1975	B 400,080	3,925,163	Dec. 9, 1975
B 379,038	3,923,994	Dec. 2, 1975	B 400,293	3,923,719	Dec. 2, 1975
B 379,172	3,914,379	Oct. 21, 1975	B 400,310	3,915,507	Oct. 28, 1975
B 379,282	3,913,462	Oct. 21, 1975	B 401,133	3,924,443	Dec. 9, 1975
B 379,955	3,913,157	Oct. 21, 1975	B 401,992	3,924,898	Dec. 9, 1975
B 380,014	3,921,915	Nov. 25, 1975	B 402,065	3,925,413	Dec. 9, 1975
B 380,141	3,925,161	Dec. 9, 1975	B 402,555	3,914,688	Oct. 21, 1975
B 380,310	3,921,048	Nov. 18, 1975	B 403,140	3,913,486	Oct. 21, 1975
B 380,312	3,913,953	Oct. 21, 1975	B 403,355	3,913,352	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975	B 403,990	3,914,684	Oct. 21, 1975
B 380,446	3,923,836	Dec. 2, 1975	B 403,996	3,916,016	Oct. 28, 1975
B 380,900	3,913,307	Oct. 21, 1975	B 404,290	3,924,918	Dec. 9, 1975
B 380,926	3,925,095	Dec. 9, 1975	B 404,437	3,915,200	Oct. 28, 1975
B 381,074	3,919,583	Nov. 11, 1975	B 405,136	3,915,565	Oct. 28, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 405,137	3,915,566	Oct. 28, 1975	B 422,399	3,928,656	Dec. 23, 1975
B 405,160	3,924,821	Dec. 9, 1975	B 422,467	3,924,804	Dec. 9, 1975
B 405,248	3,926,294	Dec. 16, 1975	B 422,949	3,921,873	Nov. 25, 1975
B 405,305	3,922,111	Nov. 25, 1975	B 424,415	3,919,458	Nov. 11, 1975
B 405,360	3,913,403	Oct. 21, 1975	B 424,462	3,920,522	Nov. 18, 1975
B 405,495	3,924,577	Dec. 9, 1975	B 424,572	3,924,979	Dec. 9, 1975
B 405,938	3,920,109	Nov. 18, 1975	B 424,748	3,924,395	Dec. 9, 1975
B 406,065	3,914,199	Oct. 21, 1975	B 425,035	3,914,025	Oct. 21, 1975
B 406,357	3,924,529	Dec. 9, 1975	B 425,345	3,922,015	Nov. 25, 1975
B 406,800	3,952,708	Apr. 27, 1976	B 425,470	3,923,796	Dec. 2, 1975
B 407,357	3,924,614	Dec. 9, 1975	B 425,539	3,916,742	Nov. 4, 1975
B 407,728	3,925,240	Dec. 9, 1975	B 425,541	3,914,051	Oct. 21, 1975
B 407,736	3,924,463	Dec. 9, 1975	B 425,572	3,923,822	Dec. 2, 1975
B 408,380	3,984,172	Oct. 5, 1976	B 425,770	3,989,817	Nov. 2, 1976
B 408,487	3,924,046	Dec. 2, 1975	B 427,631	3,921,433	Nov. 25, 1975
B 408,749	3,914,116	Oct. 21, 1975	B 428,177	3,914,624	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975	B 428,795	3,921,056	Nov. 18, 1975
B 409,220	3,915,648	Oct. 28, 1975	B 429,442	3,923,485	Dec. 2, 1975
B 409,251	3,922,620	Nov. 25, 1975	B 430,106	3,918,941	Nov. 11, 1975
B 409,657	3,927,362	Dec. 16, 1975	B 430,140	3,922,084	Nov. 25, 1975
B 409,816	3,921,317	Nov. 25, 1975	B 430,149	4,037,175	July 19, 1977
B 410,062	3,923,855	Dec. 2, 1975	B 430,385	4,001,104	Jan. 4, 1977
B 410,168	3,914,717	Oct. 21, 1975	B 430,798	3,918,204	Nov. 11, 1975
B 411,145	3,914,168	Oct. 21, 1975	B 430,944	3,922,096	Nov. 25, 1975
B 411,356	3,919,649	Nov. 11, 1975	B 432,373	3,919,670	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975	B 433,587	3,914,567	Oct. 21, 1975
B 411,633	3,914,741	Oct. 21, 1975	B 435,343	3,919,244	Nov. 11, 1975
B 412,516	3,927,417	Dec. 16, 1975	B 435,844	3,925,170	Dec. 9, 1975
B 412,619	3,925,292	Dec. 9, 1975	B 437,172	3,913,251	Oct. 21, 1975
B 412,867	3,924,587	Dec. 9, 1975	B 437,173	3,924,627	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975	B 437,195	3,914,618	Oct. 21, 1975
B 413,546	3,924,314	Dec. 9, 1975	B 437,450	3,922,479	Nov. 25, 1975
B 414,129	3,925,484	Dec. 9, 1975	B 438,053	3,916,013	Oct. 28, 1975
B 414,288	3,925,537	Dec. 9, 1975	B 438,706	3,925,050	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975	B 439,168	3,919,676	Nov. 11, 1975
B 415,124	3,915,944	Oct. 28, 1975	B 439,669	3,921,499	Nov. 25, 1975
B 415,845	3,925,076	Dec. 9, 1975	B 440,898	3,921,789	Nov. 25, 1975
B 415,847	3,914,208	Oct. 21, 1975	B 441,024	3,913,629	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975	B 441,416	3,913,851	Oct. 21, 1975
B 415,977	3,927,359	Dec. 16, 1975	B 442,280	3,914,054	Oct. 21, 1975
B 416,598	3,923,473	Dec. 2, 1975	B 442,859	3,918,570	Nov. 11, 1975
B 416,710	3,923,746	Dec. 2, 1975	B 442,919	3,925,483	Dec. 9, 1975
B 416,832	3,924,975	Dec. 9, 1975	B 444,614	3,927,996	Dec. 23, 1975
B 416,933	3,924,968	Dec. 9, 1975	B 445,471	3,914,711	Oct. 21, 1975
B 417,299	3,918,235	Nov. 11, 1975	B 445,740	3,923,612	Dec. 2, 1975
B 418,121	3,925,023	Dec. 9, 1975	B 447,417	4,024,727	May 24, 1977
B 418,153	3,925,251	Dec. 9, 1975	B 448,571	3,924,760	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975	B 449,647	3,916,797	Nov. 4, 1975
B 419,327	3,921,197	Nov. 18, 1975	B 450,499	3,920,526	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975	B 450,546	3,924,417	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975	B 450,927	3,913,844	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975	B 455,520	3,922,543	Nov. 25, 1975
B 420,514	3,923,929	Dec. 2, 1975	B 455,775	3,914,356	Oct. 21, 1975
B 420,568	3,925,069	Dec. 9, 1975	B 456,346	3,914,531	Oct. 21, 1975
B 421,026	3,914,785	Oct. 21, 1975	B 459,425	3,928,773	Dec. 23, 1975
B 421,362	3,924,817	Dec. 9, 1975	B 461,872	3,919,586	Nov. 11, 1975
B 421,383	3,925,047	Dec. 9, 1975	B 467,684	3,915,119	Oct. 28, 1975
B 421,797	3,914,023	Oct. 21, 1975	B 468,198	3,925,340	Dec. 9, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977	B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977	B 373,344	4,053,067	Feb. 3, 1976	Oct. 11, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977	B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977	B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 159,570	4,036,870	Mar. 23, 1976	July 19, 1977	B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977	B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977	B 405,899	4,097,710	Mar. 23, 1976	Mar. 21, 1978
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976	B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976	B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976	B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977	B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977	B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976	B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976	B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977	B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976	B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977	B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976	B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976	B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976	B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977	B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976	B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976	B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977	B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977	B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976	B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976	B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977	B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976	B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976	B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976	B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976	B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976	B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976	B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977	B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976	B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977	B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977	B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976	B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976	B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977	B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976	B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976	B 449,989	4,061,572	Mar. 30, 1976	Dec. 6, 1977
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977	B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976	B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976	B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976	B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976	B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977	B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976	B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976	B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976	B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976	B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976	B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977	B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976	B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976	B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976	B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976	B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977	B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976	B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976	B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977	B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976	B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976	B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976	B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976	B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976	B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977	B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976	B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976	B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977	B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977	B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976	B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976	B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976	B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977	B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977	B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977	B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976	B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976	B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977	B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977	B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977	B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976	B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977	B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976	B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976	B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977	B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977	B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977	B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976	B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976	B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976	B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,257	4,078,715	Jan. 13, 1976	Mar. 14, 1978
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,706	4,076,275	Mar. 16, 1976	Feb. 28, 1978
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 475,801	4,056,759	Mar. 30, 1976	Nov. 1, 1977
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 478,759	4,055,681	Mar. 16, 1976	Oct. 25, 1977
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976	B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977	B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976	B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976	B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976	B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976	B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976	B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977	B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977	B 497,490	4,118,377	Mar. 23, 1976	Oct. 3, 1978
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976	B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976	B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976	B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976	B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977	B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976	B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976	B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976	B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977	B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976	B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976	B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977	B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976	B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976	B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976	B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976	B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976	B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976	B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976	B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976	B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976	B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976	B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976	B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976	B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977	B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976	B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976	B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977	B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976	B 501,128	4,072,723	Feb. 24, 1976	Feb. 7, 1978
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976	B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976	B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976	B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977	B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976	B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976	B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977	B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976	B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976	B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977	B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976	B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976	B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977	B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976	B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977	B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977	B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976	B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977	B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976	B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976	B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977	B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976	B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977	B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976	B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 494,439	4,057,521	Apr. 13, 1976	Nov. 8, 1977	B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 494,440	4,056,502	Feb. 17, 1976	Nov. 1, 1977	B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 494,450	4,079,029	Feb. 17, 1976	Mar. 14, 1978	B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976	B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976	B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976	B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976	B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 495,124	4,060,968	Mar. 9, 1976	Dec. 6, 1977	B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976	B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976	B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976	B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976	B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976	B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976	B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976	B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976	B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977	B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976	B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976	B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976	B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976	B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976	B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976	B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977	B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976	B 515,216	4,076,261	Feb. 17, 1976	Feb. 28, 1978
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976	B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976	B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976	B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976	B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976	B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976	B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976	B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976	B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976	B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976	B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977	B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977	B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977	B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976	B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976	B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976	B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976	B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977	B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976	B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 507,456	4,080,349	Mar. 9, 1976	Mar. 21, 1978	B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976	B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976	B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976	B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976	B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976	B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977	B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976	B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976	B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976	B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976	B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976	B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976	B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976	B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976	B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976	B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977	B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976	B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976	B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977	B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977	B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976	B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977	B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976	B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976	B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976	B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976	B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976	B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976	B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977	B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977	B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976	B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976	B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976	B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976	B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976	B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976	B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976	B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976	B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976	B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976	B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977	B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976	B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976	B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976	B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976	B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976	B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976	B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977	B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976	B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976	B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976	B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976	B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976	B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977	B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976	B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 513,346	4,124,330	Mar. 9, 1976	Nov. 7, 1978	B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976	B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976	B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976	B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977	B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976	B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977	B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977	B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976	B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977	B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976	B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976	B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976	B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977	B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976	B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976	B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976	B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977	B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977	B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976	B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976	B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977	B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977	B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976	B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976	B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976	B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 537,990	4,057,651	Jan. 13, 1976	Nov. 8, 1977
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977	B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976	B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976	B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976	B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976	B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977	B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977	B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976	B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976	B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976	B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976	B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976	B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976	B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976	B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977	B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976	B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976	B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976	B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977	B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976	B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976	B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976	B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976	B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976	B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976	B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976	B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976	B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976	B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976	B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976	B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976	B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976	B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976	B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976	B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976	B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976	B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977	B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976	B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976	B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976	B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976	B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976	B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976	B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976	B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976	B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977	B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976	B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977	B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976	B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977	B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976	B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976	B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976	B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976	B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977	B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976	B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977	B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977	B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976	B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977	B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977	B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976	B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977	B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976	B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976	B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976	B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976	B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976	B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976	B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977	B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976	B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976	B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977	B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976	B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976	B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976	B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976	B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976	B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976	B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976	B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976	B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977	B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977	B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977	B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977	B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976	B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977	B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977	B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976	B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977	B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976	B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976	B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977	B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977	B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976	B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976	B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976	B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976	B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976	B 632,416	4,076,698	Mar. 9, 1976	Feb. 28, 1978
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 7TH DAY OF NOVEMBER, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Kehr, William D.; and Turk, Harold L. Wear resistant nickel-zinc ferrite. T976,003, 11-7-78, Cl. 252-62.620.

Schuck, Thomas W. Liquid cryogen transfer system. T976,001, 11-7-78, Cl. 62-55.000.

Turk, Harold L.: *See*—
Kehr, William D.; and Turk, Harold L., T976,003, Cl. 252-62.620.

Vanderslice, Charles W. Toothpaste containing benzyl hydroxyethyl cellulose as a binder. T976,002, 11-7-78, Cl. 424-49.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF NOVEMBER, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Inc.: *See*—
Lunsford, Carl D.; and Helsley, Grover C., Re. 29,828, Cl. 260-326.470.

AMP Incorporated: *See*—
Sheesley, Wilmer L., Re. 29,822, Cl. 339-5.00M.

Bordenca, Carl; Dorschner, Kenneth P.; and Johnson, Robert P., to SCM Corporation. Insect repellent compositions and process having an N-substituted hydroxyalkyl amine as an active ingredient. Re. 29,829, Cl. 260-584.00R.

Dominion Foundries and Steel, Limited: *See*—
Prust, Michael W.; and Glassman, Wayne C., Re. 29,827, Cl. 148-6.200.

Dorschner, Kenneth P.: *See*—
Bordenca, Carl; Dorschner, Kenneth P.; and Johnson, Robert P., Re. 29,829, Cl. 260-584.00R.

General Tire & Rubber Co., The: *See*—
Sievers, David L.; Hipsher, Gary L.; and Vosburgh, Robert, deceased, Re. 29,823, Cl. 403-225.000.

Glassman, Wayne C.: *See*—
Prust, Michael W.; and Glassman, Wayne C., Re. 29,827, Cl. 148-6.200.

Helsley, Grover C.: *See*—
Lunsford, Carl D.; and Helsley, Grover C., Re. 29,828, Cl. 260-326.470.

Hipsher, Gary L.: *See*—
Sievers, David L.; Hipsher, Gary L.; and Vosburgh, Robert, deceased, Re. 29,823, Cl. 403-225.000.

Johnson, Robert P.: *See*—
Bordenca, Carl; Dorschner, Kenneth P.; and Johnson, Robert P., Re. 29,829, Cl. 260-584.00R.

Keller, Wolfgang, to Siemens Aktiengesellschaft. Apparatus for crucible-free zone melting of semiconductor crystal rods. Re. 29,824, Cl. 422-250.000.

Keller, Wolfgang, to Siemens Aktiengesellschaft. Apparatus for crucible-free zone melting of semiconductor crystal rods. Re. 29,825, Cl. 422-250.000.

Konagai, Yoshihiro: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, Re. 29,826, Cl. 71-67.000.

Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, to Kumiai Chemical Industry Co., Ltd. Stabilized non-medical fungicidal, bactericidal and algicidal composition. Re. 29,826, Cl. 71-67.000.

Kumiai Chemical Industry Co., Ltd.: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, Re. 29,826, Cl. 71-67.000.

Lunsford, Carl D.; and Helsley, Grover C., to A. H. Robins Company, Inc. 1-Substituted-3-amidopyrrolidines. Re. 29,828, Cl. 260-326.470.

Muto, Makoto: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, Re. 29,826, Cl. 71-67.000.

Prust, Michael W.; and Glassman, Wayne C., to Dominion Foundries and Steel, Limited. Compositions and processes for producing chromium conversion coatings on surfaces of zinc or cadmium. Re. 29,827, Cl. 148-6.200.

Sato, Hironari: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, Re. 29,826, Cl. 71-67.000.

SCM Corporation: *See*—
Bordenca, Carl; Dorschner, Kenneth P.; and Johnson, Robert P., Re. 29,829, Cl. 260-584.00R.

Sheesley, Wilmer L., to AMP Incorporated. Electrical contact system. Re. 29,822, Cl. 339-5.00M.

Siemens Aktiengesellschaft: *See*—
Keller, Wolfgang, Re. 29,824, Cl. 422-250.000.
Keller, Wolfgang, Re. 29,825, Cl. 422-250.000.

Sievers, David L.; Hipsher, Gary L.; and Vosburgh, Robert, deceased, to General Tire & Rubber Co., The. Resilient bushing with long fatigue life. Re. 29,823, Cl. 403-225.000.

Takahashi, Yoshio: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, Re. 29,826, Cl. 71-67.000.

Vosburgh, Robert, deceased: *See*—
Sievers, David L.; Hipsher, Gary L.; and Vosburgh, Robert, deceased, Re. 29,823, Cl. 403-225.000.

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Armstrong Nurseries, Inc.: *See*—
Delbard, Georges, 4,330, Cl. 22.000.

Delbard, Georges, to Armstrong Nurseries, Inc. Rose plant. 4,330, 11-7-78, Cl. 22.000.

Jackson & Perkins Co.: *See*—
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Warriner, William A., to Jackson & Perkins Co. Rose plant. 4,331, 11-7-78, Cl. 26.000.

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Goldfarb, Adolph E.; Benkoe, Erwin, deceased; and Benkoe, Elisabeth, executrix, 250,216, Cl. D34-15.0AJ.

Benkoe, Erwin, deceased: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin, deceased; and Benkoe, Elisabeth, executrix, 250,216, Cl. D34-15.0AJ.

Benoit, Roland A., to InterRoyal Corporation. Chair. 250,154, 11-7-78, Cl. D6-73.000.

Berger, Dieter; and Weiss, Erich, to Boehringer Mannheim GmbH. Dispenser for microscope slides. 250,220, 11-7-78, Cl. D52-2.00R.

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Boehringer Mannheim GmbH: *See—*
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Bradley, Daniel J. Van tray. 250,224, 11-7-78, Cl. D87-1.00R.

Brandt, Michael W. Spout opener. 250,168, 11-7-78, Cl. D8-40.000.

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Carlson, Philip A.: *See—*
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Clark, Forrest W.; and Donohoe, David G., 250,222, Cl. D56-1.00E.

Chodorow, Ingram S., to Placontrol, Inc. Dental floss holder. 250,214, 11-7-78, Cl. D28-64.000.

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Kelly, Maxine, 250,157, Cl. D6-172.000.
Kelly, Maxine, 250,158, Cl. D6-172.000.

Clairol, Inc.: *See—*
Levin, Monte L., 250,206, Cl. D24-38.000.

Clark, Forrest W.; and Donohoe, David G., to CBS Inc. Receiver hardware for percussive musical instruments and accessories therefor. 250,221, 11-7-78, Cl. D56-1.00E.

Clark, Forrest W.; and Donohoe, David G., to CBS Inc. Receiver hardware for percussive musical instruments. 250,222, 11-7-78, Cl. D56-1.00E.

Clary, Robert M.: *See—*
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Davies, Peter O., to Tullen Industries Limited. Cutting tool. 250,166, 11-7-78, Cl. D8-5.000.

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Diamond Shamrock Corporation: *See—*
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Hazerjian, Minas P.; and Hazerjian, Kevork P. Yard light cover. 250,218, 11-7-78, Cl. D48-38.000.

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Kelly, Maxine, to Ciani, Inc. Jewelry display case. 250,158, 11-7-78, Cl. D6-172.000.

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CLASSIFICATION OF PATENTS

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59 4,124,500
63 R 4,124,505
69 4,124,506
134 4,124,488
141 4,124,507
194 4,124,508
321 B 4,124,509
4,124,510
447 4,124,511

CLASS 211

74 4,124,122
186 4,124,123

CLASS 212

69 4,124,124

CLASS 214

1 BB 4,124,125
1 Q 4,124,126
6 C 4,124,127
6 DK 4,124,128
38 C 4,124,129
75 R 4,124,130
83.24 4,124,131
301 4,124,132
707 4,124,133

CLASS 215

224 4,124,134

CLASS 219

124.34 4,124,792
523 4,124,793
530 4,124,794

CLASS 220

4 B 4,124,135
68 4,124,136
86 R 4,124,137
90.2 4,124,138
268 4,124,139
304 4,124,140
306 4,124,141

CLASS 221

75 4,124,142
82 4,124,143
191 4,124,144

CLASS 222

56 4,124,145
70 4,124,146
135 4,124,147
321 4,124,148
402.19 4,124,149
494 4,124,150
498 4,124,151
604 4,124,152

CLASS 223

102 4,124,153

CLASS 224

7 E 4,124,154
42.1 D 4,124,155

CLASS 226

25 4,124,156

CLASS 228

49 4,124,157

CLASS 229

15 4,124,158
17 R 4,124,159
21 4,124,160
37 R 4,124,161

CLASS 235

70 A 4,124,795
88 R 4,124,796
467 4,124,797

CLASS 237

2 B 4,124,177
19 4,124,178
28 4,124,179

CLASS 239

288.5 4,124,162
533.15 4,124,163
4,124,164
548 4,124,165
662 4,124,166
673 4,124,167

CLASS 241

14 4,124,168
101.4 4,124,169
265 4,124,170

CLASS 242

2 4,124,171
55.53 4,124,172
72 B 4,124,173
84.2 R 4,124,174
107.7 4,124,175
156 4,124,176

CLASS 244

82 4,124,180
137 R 4,124,181
153 R 4,124,182

CLASS 245

6 4,124,183

CLASS 248

66 4,124,184
98 4,124,185
188 4,124,186
188.3 4,124,187
188.6 4,124,188
489 4,124,189
538 4,124,190

CLASS 250

213 VT 4,124,798
252 4,124,799
260 4,124,800
288 4,124,801
358 R 4,124,804
492 A 4,124,802
559 4,124,803

CLASS 251

129 4,124,192
144 4,124,193
159 4,124,194
333 4,124,195

CLASS 252

8.55 D 4,124,512
8.6 4,124,543
46.7 4,124,513
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62 4,124,515
79.2 4,124,516
89 DC 4,124,517
91 4,124,518
99 4,124,519
106 4,124,520
127 4,124,521
142 4,124,522
145 4,124,523
301.1 R 4,124,524
301.1 W 4,124,525
301.19 4,124,484
316 4,124,526
408 4,124,527
411 R 4,124,528
421 4,124,529
428 4,124,531
429 B 4,124,530
4,124,532
431 P 4,124,533
441 4,124,534
448 4,124,535
455 R 4,124,536
465 4,124,537
466 PT 4,124,538
518 4,124,539
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522 4,124,541
546 4,124,542

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13.1 4,124,197
24 4,124,198

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18 N 4,124,549
23 AR 4,124,551
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4,124,586
239.3 R 4,124,584
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346.11 4,124,600
346.22 4,124,601
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347.7 4,124,604
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397.25 4,124,607
405 4,124,608
406 4,124,609
408 4,124,610
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4,124,616
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410.6 4,124,618
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449.6 M 4,124,629
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CLASS 261

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23 A 4,124,661
41 D 4,124,662

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29.5 4,124,667
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158 4,124,200

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CLASS 271

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233 4,124,205

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23 A 4,124,216
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CLASS 277

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40 4,124,219
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CLASS 280

154.5 R 4,124,221
221 4,124,222
408 4,124,615
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765 4,124,226

CLASS 282

27.5 4,124,227

CLASS 285

1 4,124,228
18 4,124,229
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247 4,124,234
340 4,124,235
373 4,124,236

CLASS 289

18 4,124,237

CLASS 290

1 R 4,124,805

CLASS 292

173 4,124,238
210 4,124,239
262 4,124,240

CLASS 294

51 4,124,241
61 4,124,242
70 4,124,243
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CLASS 296

28 C 4,124,246
100 4,124,247

CLASS 297

204 4,124,248
217 4,124,249
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452 4,124,252

CLASS 299

6 4,124,253

CLASS 303

2 4,124,254

CLASS 305

41 4,124,255

CLASS 307

264 4,124,806
279 4,124,807
362 4,124,808

CLASS 308

174 4,124,256
194 4,124,257
236 4,124,258

CLASS 310

361 4,124,809

CLASS 312

39 4,124,259
107 4,124,260
183 4,124,261
305 4,124,262

CLASS 315

15 4,124,810

CLASS 316

1 4,124,263

CLASS 318

293 4,124,811
371 4,124,812

CLASS 324

0.5 A 4,124,813
208 4,124,814

CLASS 325

51 4,124,815
344 4,124,817
363 4,124,818
479 4,124,819

CLASS 328

55 4,124,820
151 4,124,821

CLASS 330

10 4,124,822
56 4,124,823
252 4,124,824
279 4,124,825

CLASS 331

94.5 H 4,124,826
135 4,124,827

CLASS 333

30 R 4,124,828
71 4,124,829
73 W 4,124,830

CLASS 335

16 4,124,831
128 4,124,832
186 4,124,833

CLASS 336

58 4,124,834

CLASS 337

1 4,124,835
186 4,124,836
251 4,124,837

CLASS 339

5 M Re.29,822
59 M 4,124,264
97 C 4,124,266
97 R 4,124,265
125 R 4,124,267

CLASS 340

1 R 4,124,838
151 4,124,839
321 4,124,842
337 4,124,843
347 AD 4,124,844
347 DA 4,124,845
501 4,124,840
524 4,124,848
540 4,124,846
545 4,124,847
690 4,124,841

CLASS 343

7 G	4,124,849
7.3	4,124,850
772	4,124,851
854	4,124,852

CLASS 346

140 R	4,124,853
155	4,124,854

CLASS 350

3.63	4,124,268
6.8	4,124,269
96.12	4,124,270
96.20	4,124,271
96.21	4,124,272
150	4,124,273
184	4,124,274
187	4,124,275
188	4,124,276
310	4,124,277
342	4,124,278
345	4,124,279
358	4,124,280
	4,124,281

CLASS 351

168	4,124,282

CLASS 352

91 C	4,124,283

CLASS 353

25	4,124,284
28	4,124,285

CLASS 354

24	4,124,855
86	4,124,856
198	4,124,857
200	4,124,858
296	4,124,859

CLASS 355

3 R	4,124,286
	4,124,287
8	4,124,288
14	4,124,289
22	4,124,291
37	4,124,292
41	4,124,290
58	4,124,293
68	4,124,294
	4,124,295
75	4,124,296

CLASS 356

308	4,124,297
338	4,124,298
397	4,124,299
429	4,124,300
432	4,124,301
440	4,124,302
445	4,124,303

CLASS 357

19	4,124,860
24	4,124,861
	4,124,862
54	4,124,863
70	4,124,864

CLASS 358

126	4,124,865
128	4,124,866
	4,124,867
	4,124,868
171	4,124,869
260	4,124,870
287	4,124,871

CLASS 360

72	4,124,872
74	4,124,873
121	4,124,874

CLASS 361

227	4,124,875
325	4,124,876
393	4,124,877
415	4,124,878

CLASS 362

26	4,124,879
35	4,124,880
253	4,124,881
300	4,124,882
350	4,124,883

CLASS 363

21	4,124,884
56	4,124,885
121	4,124,886

CLASS 364

107	4,124,887
200	4,124,888
	4,124,889
	4,124,890
	4,124,891
	4,124,892
	4,124,893
417	4,124,894
514	4,124,895
557	4,124,896
571	4,124,897
703	4,124,898
716	4,124,899

CLASS 365

72	4,124,900
88	4,124,901

CLASS 366

60	4,124,304
69	4,124,305
75	4,124,306
76	4,124,307
77	4,124,308
314	4,124,310
340	4,124,309

CLASS 400

90	4,124,311
144.2	4,124,312
491.2	4,124,313
663	4,124,314

CLASS 401

48	4,124,315
184	4,124,316

CLASS 403

8	4,124,317
14	4,124,318
24	4,124,319
163	4,124,320
167	4,124,321
225	Re.29,823
295	4,124,322
402	4,124,323

CLASS 404

3	4,124,324
75	4,124,325

CLASS 405

68	4,123,911
220	4,123,912
244	4,123,913

CLASS 407

114	4,124,326

CLASS 408

140	4,124,327
223	4,124,328

CLASS 415

85	4,124,329

CLASS 416

157 B	4,124,330

CLASS 417

19	4,124,331
26	4,124,332
218	4,124,333
480	4,124,334

CLASS 418

73	4,124,335
94	4,124,060

CLASS 422

181	4,124,357
250	Re.29,824
	Re.29,825

CLASS 423

126	4,124,680
166	4,124,683
179.5	4,124,684
210	4,124,681
328	4,124,686
404	4,124,687
432	4,124,688
437	4,124,689
446	4,124,690
449	4,124,691
492	4,124,692
495	4,124,682
503	4,124,693
538	4,124,694
	4,124,695
574 L	4,124,685
574 R	4,124,696
580	4,124,697
628	4,124,699

CLASS 424

1	4,124,700
12	4,124,701
85	4,124,702
118	4,124,626
177	4,124,703
180	4,124,704
	4,124,705
230	4,124,706
241	4,124,707
243	4,124,708
248.4	4,124,709
248.56	4,124,710
250	4,124,711
	4,124,712
256	4,124,713
263	4,124,714
266	4,124,715
267	4,124,716
270	4,124,717
274	4,124,718
	4,124,719
278	4,124,720
285	4,124,721
308	4,124,722
311	4,124,723
317	4,124,724
330	4,124,725
331	4,124,726

CLASS 425

4 C	4,124,336
28 P	4,124,337
78	4,124,338
133.1	4,124,339
135	4,124,340
136	4,124,341
141	4,124,342
145	4,124,343
174.4	4,124,344
183	4,124,345
188	4,124,346
208	4,124,347
297	4,124,348
367	4,124,349
393	4,124,350
532	4,124,351
556	4,124,352

CLASS 426

549	4,124,727

CLASS 427

8	4,124,728
58	4,124,729
220	4,124,730

CLASS 428

36	4,124,731
77	4,124,732
212	4,124,733
403	4,124,734
406	4,124,735
622	4,124,736
640	4,124,737

CLASS 429

56	4,124,738
61	4,124,739
104	4,124,740
105	4,124,741
122	4,124,742
144	4,124,743
193	4,124,744
208	4,124,745
210	4,124,746
	4,124,747

CLASS 431

8	4,124,353
46	4,124,354

CLASS 521

26	4,124,544
129	4,124,545

CLASS 526

8	4,124,748
15	4,124,749
18	4,124,575
20	4,124,750
82	4,124,751
94	4,124,752
208	4,124,753
220	4,124,754

CLASS 528

53	4,124,573
59	4,124,568
61	4,124,569
76	4,124,572
	4,124,574
168	4,124,567
177	4,124,566
273	4,124,570

CLASS 536

9	4,124,755
17	4,124,756
23	4,124,757
43	4,124,758
121	4,124,759

CLASS 542

432	4,124,760

CLASS 544

27	4,124,761
28	4,124,762
219	4,124,763
251	4,124,764
313	4,124,765

CLASS 546

21	4,124,588
70	4,124,589
90	4,124,587
221	4,124,590

CLASS 548

337	4,124,766
341	4,124,767

CLASS 560

19	4,124,768
121	4,124,769

CLASS 562

402	4,124,636
503	4,124,623
	4,124,624
	4,124,625
532	4,124,634
533	4,124,635
598	4,124,633

CLASS 568

601	4,124,641
671	4,124,647
758	4,124,770
817	4,124,648
	4,124,771

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	319	250,147
D4—	25	250,148
D6—	15	250,149
	24	250,150
	45	250,151
	48.1	250,152
	69	250,153
	73	250,154
	84	250,155
	116	250,156
	172	250,157
		250,158
	181	250,159
	241	250,160
	253	250,161
D7—	13	250,162
	19	250,163
	186	250,164
D8—	5	250,165
		250,166
	29	250,167
	40	250,168
	336	250,169
D9—	100	250,170
	223	250,171
	237	250,172
	294	250,173
D10—	1	250,174
	15	250,175
		250,176
	62	250,177
	75	250,178
	129	250,179
D11—	8	250,180
	157	250,181
D12—	98	250,182
	157	250,183
D13—	33	250,184
	99	250,185
		250,186
D14—	42	250,187
	43	250,188
	59	250,189
	70	250,190
		250,191
	94	250,192
D15—	28	250,193
	78	250,194
	112	250,195
	124	250,196
	140	250,197
D16—	06	250,198
	21	250,199
D19—	1	250,200
	23	250,201
D23—	65	250,202
	97	250,203
		250,204
D24—	36	250,205
	38	250,206
	59	250,207
D25—	33	250,208
D27—	02	250,209
D28—	50	250,210
		250,211
		250,212
		250,213
	84	250,214
D34—	5 PP	250,215
	15 AJ	250,216
D48—	24 R	250,217
	38	250,218
		250,219
D52—	2 R	250,220
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10 : 4,124,373
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11 : 4,124,012
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13 : 4,123,881
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18 : Re.29,823
4,123,858
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19 : 4,124,055
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21 : 4,123,848
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22 : 4,124,124
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23 : 4,124,038
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24 : 4,123,809
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25 : 4,123,817
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26 : 4,123,813
4,123,821
4,123,834
4,123,864
4,123,874

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

	4,123,879		4,124,020		4,124,618		4,124,423		4,124,535		4,124,013
	4,123,898		4,124,145		4,124,619		4,124,430		4,124,546		4,124,208
	4,123,912		4,124,172		4,124,626		4,124,431		4,124,555		4,124,498
	4,123,914		4,124,239		4,124,635		4,124,436		4,124,556		4,124,600
	4,123,916		4,124,265		4,124,639		4,124,440		4,124,565		4,124,663
	4,123,931		4,124,437		4,124,644		4,124,470		4,124,570	48 :	4,123,855
	4,123,952		4,124,497		4,124,647		4,124,495		4,124,664		4,123,861
	4,123,956		4,124,602		4,124,692		4,124,508		4,124,679		4,123,886
	4,123,957		4,124,603		4,124,693		4,124,513		4,124,715		4,123,922
	4,123,961		4,124,605		4,124,698		4,124,514		4,124,750		4,123,958
	4,123,998		4,124,704		4,124,707		4,124,521	40 :	4,124,073		4,123,990
	4,124,000		4,124,725		4,124,713		4,124,540		4,124,110		4,124,070
	4,124,006	29 :	4,123,824		4,124,714		4,124,580		4,124,340		4,124,071
	4,124,014		4,123,853		4,124,723		4,124,604		4,124,627		4,124,074
	4,124,058		4,123,946		4,124,728		4,124,606		4,124,681		4,124,075
	4,124,066		4,124,018		4,124,734		4,124,628		4,124,846		4,124,082
	4,124,086		4,124,041		4,124,749		4,124,654	41 :	4,123,987		4,124,194
	4,124,096		4,124,076		4,124,753		4,124,667	42 :	Re.29,822		4,124,245
	4,124,097		4,124,193		4,124,757		4,124,690		4,123,832		4,124,285
	4,124,098		4,124,371		4,124,766		4,124,700		4,123,833		4,124,312
	4,124,099		4,124,375		4,124,774		4,124,722		4,123,839		4,124,339
	4,124,100		4,124,449		4,124,775		4,124,735		4,123,885		4,124,483
	4,124,106		4,124,481		4,124,810		4,124,740		4,123,890		4,124,511
	4,124,121		4,124,506		4,124,818		4,124,744		4,123,891		4,124,608
	4,124,122		4,124,533		4,124,823		4,124,779		4,123,894		4,124,617
	4,124,129		4,124,661		4,124,826		4,124,793		4,123,920		4,124,665
	4,124,155		4,124,786		4,124,864		4,124,795		4,123,940		4,124,732
	4,124,165	31 :	4,124,237		4,124,867		4,124,835		4,123,988		4,124,758
	4,124,179	32 :	4,123,882		4,124,875		4,124,839		4,124,019		4,124,797
	4,124,184		4,124,051		4,124,884		4,124,849		4,124,032		4,124,800
	4,124,192	33 :	4,124,784	35 :	4,123,865		4,124,851		4,124,057		4,124,860
	4,124,206		4,124,788		4,124,090		4,124,861		4,124,109		4,124,894
	4,124,240		4,124,878	36 :	4,123,804		4,124,862		4,124,114		4,124,896
	4,124,242	34 :	4,123,872		4,123,808		4,124,885		4,124,116		4,124,897
	4,124,303		4,123,923		4,123,816		4,124,887		4,124,128	49 :	4,124,811
	4,124,315		4,123,924		4,123,838	37 :	4,123,977		4,124,164		4,124,844
	4,124,316		4,123,941		4,123,852		4,124,186		4,124,199	51 :	Re.29,828
	4,124,318		4,123,944		4,123,887	38 :	4,124,084		4,124,212		4,123,913
	4,124,326		4,123,953		4,123,936	39 :	Re.29,829		4,124,244		4,124,064
	4,124,328		4,123,981		4,123,963		4,123,822		4,124,367		4,124,197
	4,124,360		4,123,983		4,123,972		4,123,867		4,124,370		4,124,221
	4,124,389		4,123,984		4,124,034		4,123,876		4,124,382		4,124,323
	4,124,414		4,124,007		4,124,063		4,123,933		4,124,407		4,124,444
	4,124,432		4,124,025		4,124,094		4,124,002		4,124,450		4,124,792
	4,124,445		4,124,027		4,124,136		4,124,045		4,124,485	53 :	4,123,973
	4,124,523		4,124,044		4,124,146		4,124,093		4,124,518		4,124,115
	4,124,577		4,124,089		4,124,156		4,124,104		4,124,557		4,124,150
	4,124,599		4,124,102		4,124,189		4,124,112		4,124,567		4,124,157
	4,124,601		4,124,103		4,124,204		4,124,113		4,124,578		4,124,347
	4,124,607		4,124,140		4,124,213		4,124,123		4,124,609		4,124,359
	4,124,610		4,124,159		4,124,214		4,124,126		4,124,633		4,124,466
	4,124,611		4,124,173		4,124,235		4,124,133		4,124,645	54 :	4,124,552
	4,124,612		4,124,176		4,124,252		4,124,188		4,124,678		4,124,721
	4,124,613		4,124,238		4,124,263		4,124,210		4,124,682	55 :	4,123,857
	4,124,614		4,124,314		4,124,287		4,124,225		4,124,685		4,123,870
	4,124,615		4,124,348		4,124,300		4,124,234		4,124,702		4,123,875
	4,124,616		4,124,356		4,124,336		4,124,306		4,124,746		4,123,915
	4,124,620		4,124,424		4,124,381		4,124,310		4,124,759		4,123,947
	4,124,621		4,124,427		4,124,385		4,124,337		4,124,805		4,123,979
	4,124,622		4,124,478		4,124,387		4,124,338		4,124,807		4,124,050
	4,124,623		4,124,512		4,124,390		4,124,343		4,124,834		4,124,065
	4,124,624		4,124,539		4,124,392		4,124,346		4,124,854		4,124,153
	4,124,625		4,124,554		4,124,396		4,124,412	44 :	4,124,151		4,124,160
	4,124,691		4,124,571		4,124,398		4,124,425	45 :	4,123,982		4,124,161
	4,124,741		4,124,587		4,124,401		4,124,435	46 :	4,123,992		4,124,701
27 :	4,124,769		4,124,588		4,124,402		4,124,471	47 :	4,123,814		4,124,790
	4,123,831		4,124,593		4,124,403		4,124,534		4,123,949	56 :	4,124,081
	4,123,918		4,124,595		4,124,410						

DESIGN PATENTS

6 :	250,167		250,209	24 :	250,205		250,155		250,204	42 :	250,175
	250,221		250,216	25 :	250,148		250,157	39 :	250,161	44 :	250,180
	250,222	09 :	250,154		250,153		250,158		250,164	48 :	250,159
	250,225		250,169		250,196		250,191		250,170		250,163
9 :	250,214	12 :	250,149		250,218		250,198		250,185		250,168
06 :	250,156		250,151	26 :	250,181		250,206		250,186		250,187
	250,177	17 :	250,172	34 :	250,200		250,207		250,195	50 :	250,203
	250,179		250,173	35 :	250,208		250,223		250,197	53 :	250,224
	250,189		250,178	36 :	250,150	37 :	250,183	41 :	250,152	55 :	250,202
	250,201		250,215								

PLANT PATENTS

06 :	4,331										

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

08 :	T976,003	10 :	T976,002	42 :	T976,001						

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GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

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